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THE USE OF PROTAMINE ZINC INSULIN IN THE TREATMENT OF DIABETES MELLITUS.*

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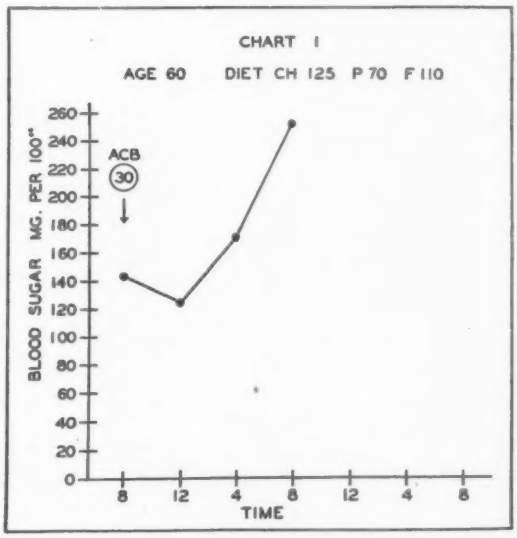
In 1936 Hagedorn, *et al*[1] reported in this country their results in the treatment of diabetes mellitus with a combination of protamine and regular insulin, showing that this protein derived from fish sperm proved to be most efficient in prolonging the action of regular insulin. Scott and Fisher,[2] suggested that the addition of zinc to this new type of insulin prolonged its effect and made a much more stable product. Shortly after the appearance of Hagedorn's paper we were able to obtain a small amount of protamine insulin and later protamine zinc insulin for clinical trial in the University of Virginia Hospital.† Since this time 136 patients with diabetes mellitus have been placed on (1) protamine zinc insulin before breakfast, (2) in combination with regular insulin, but given separately, before breakfast, and (3) in combination with regular insulin, with the latter before breakfast and protamine zinc insulin at various times during the twenty-four hours. It is proposed to analyze these groups with reference to (1) adequacy of control of the disease, (2) time of administration of protamine zinc insulin, (3) shock, (4) the amount of carbohydrate in the diet, and (5) other pertinent data which might elucidate the role of this long acting insulin in the treatment of diabetes mellitus.

In Table I the essential data is given for cases treated with one dose of protamine zinc insulin.

In most instances the dose was administered before breakfast, the patients being told to take it as soon as they got out of bed instead of waiting until twenty minutes before the meal. Twenty-four of these fifty-six patients were placed on diets containing from 100 to 150 grams of carbohydrate and thirty-two on diets containing more than 150 grams of carbohydrate. In this group two were under twenty years of age, seven between twenty-one and forty, and forty-seven over forty years of age. Twenty-three of these patients are still on one dose of protamine zinc insulin and are considered to be under satisfactory control. "Satisfactory control" indicates that the patient is usually free of glycosuria



with the blood sugars within a fairly normal range and without severe shock or other untoward manifestations. Two of these patients are now taking no insulin and are still considered to be satisfactorily controlled, twenty have not been heard from, six are not doing well and one is now on regular insulin alone. Two patients are dead and two find it necessary to take both regular and protamine zinc insulin, one of whom is satisfactorily controlled.

Chart 1 gives an illustrative blood sugar curve on

*Read before the seventieth annual session of the Medical Society of Virginia, at Richmond, October 3-5, 1939.

†Through the courtesy of the Eli Lilly Company, Indianapolis, Ind.

TABLE I.—PROTAMINE ZINC INSULIN ALONE

DATE	AGE	SEX	DURATION RACE	YRS.	INSULIN	DIET C	P	F	FOLLOW-UP MOS.	REMARKS
10/16/36	60	F	W	3.	**10** ACB	100	70	100	32	No shock. Condition excellent.
12/15/36	59	M	W	.1	**10** ACB	150	60	100	20	Mild osteomyelitis. No insulin since 1937. Sugar free.
1/17/37	56	F	W	.6	**20** 9 P.M.	125	70	120	33	No shock. No sugar.
2/28/37	55	M	W	29.	**18** ACB	175	60	120	31	Mild angina. Doing well. No shock. Occ. sugar.
3/ 1/37	57	F	W	6.	**47** ACB	160	70	100	30	No sugar. No shock. Doing well.
3/12/37	71	M	W	2.	**30** ACB	175	80	110	0	
4/ 8/37	55	M	W	2.	**35** ACB	150	70	110	27	Neuritis. Epilepsy. In and out of control. 7/14/39 out of control. Left against advice.
5/ 7/37	60	F	W	.1	**30** ACB	125	70	110	27	Good control. **35** ACB. Occ. slight shock.
5/26/37	45	F	W	7.	**25** ACB	Restricted CH			28	Now no insulin. Occ. shock.
6/ 2/37	57	F	W	17.	**25** ACB	150	70	100	26	Took insulin until 2 weeks ago. Well controlled 8/25/39.
6/21/37	56	M	W	4.5	**33** 2 P.M.	150	70	100	0	Carbuncle. Gangrene.
6/21/37	64	F	W	5.	**20** ACB	125	70	100	27	Same insulin. Off diet. Showing sugar. No shock.
7/29/37	11	M	W	3.	**20** ACD	250	70	100	25	Taking 50 regular. Very variable diet.
8/14/37	39	F	C	1.	**25** ACB	150	70	110	25	**20** ACB. Occ. sugar. No shock.
10/ 9/37	27	F	W	.3	**15** ACB	165	80	100	23	18 **20** ACB. Change due to infection. Mild shock. No sugar.
11/10/37	70	F	W	4.	**15** ACB	Restricted CH			20	**7** ACB. No sugar. No shock.
1/11/38	65	M	W	3.	**12** ACB	175	70	90	0	
1/18/38	65	F	W	1.	**35** ACB	175	70	110	21	No insulin. No sugar.
2/10/38	58	M	W	6.	**30** ACB	200	80	120	16	**20** ACB. No shock. No sugar. Operation—hyperthyroidism.
3/27/38	73	M	W	1.	**30** ACB	175	70	110	0	Dead.
4/ 7/38	69	M	W	?	**12** ACB	Restricted CH			17	No sugar. No shock.
4/19/38	62	F	W	7.	**38** ACB	120	60	110	15	No sugar. Mild shock. 20 ACB.
6/13/38	65	M	W	1.	**12** ACB	175	70	90	0	
7/11/38	50	F	W	.7	**18** ACB	140	70	100	0	
9/11/38	34	M	W	1.8	**45** ACB	250	80	120	0	
9/19/38	73	M	W	5.	**35** ACB	150	70	80	9	Off diet. Showing sugar.
9/18/38	55	M	W	.1	**40** ACB	175	70	110	8	No sugar. Blood sugar 132. Carcinoma rectum.
10/ 3/38	53	F	W	.10	**20** ACB	150	70	100	7	5/39 died apoplexy. Diabetes controlled.
10/ 5/38	59	M	W	?	**35** ACB	200	70	110	10	No sugar. No shock. **30** ACB. Hodgkins disease.
10/21/38	61	M	W	.1	**25** ACB	200	80	110	11	9/21/39 no insulin for 2 mos. Showing sugar. Now back on **25** ACB.
10/22/38	65	M	W	?	**65** ACB	175	70	110	0	Cholecystitis.
10/25/38	46	F	W	?	**50** ACB	200	70	110	0	
10/28/38	54	M	C	3.	**40** ACB	175	70	110	8	25 Not satisfactory. On **65** ACB.
11/ 7/38	45	F	C	2.6	**50** ACB	175	70	110	0	
11/11/38	61	F	W	3.	**20** ACB	175	70	90	0	
11/15/38	70	F	W	8.	**50** ACB	150	70	100	0	
11/25/38	29	M	C	4.	**23** ACB	225	70	110	7	No insulin for 2 days. Much sugar. All right before.
1/ 4/39	50	M	W	?	**30** ACB	150	80	80	0	
1/31/39	74	M	W	8.	**30** ACB	175	70	80	8	9/21/39 **10** ACB. No shock. No sugar.
2/15/39	47	F	W	?	**35** ACB	150	70	100	7	Blood sugar 72. **10** ACB. No shock.
2/18/39	29	M	W	?	**40** ACB	225	70	110	6	No shock. No sugar.
3/ 3/39	66	M	W	6.	**35** ACB	175	80	100	0	

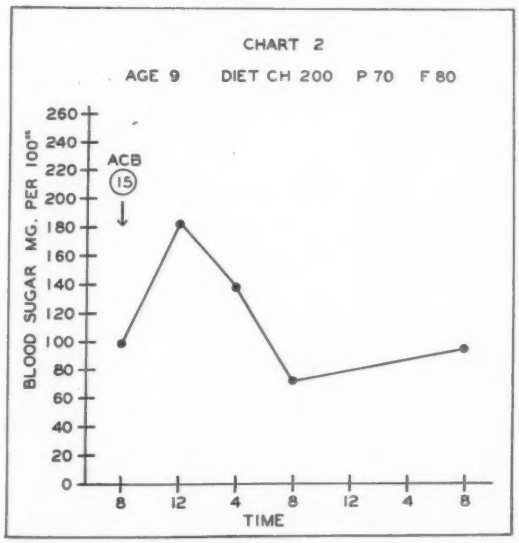
TABLE I.—PROTAMINE ZINC INSULIN ALONE (*Continued*)

DATE	AGE	SEX	RACE	DURATION YRS.	INSULIN	DIET C	DIET P	DIET F	FOLLOW-UP MOS.	REMARKS
3/19/39	70	M	W	1.	**25** ACB	175	70	100	0	
3/20/39	35	M	W	.4	**35** ACB	250	70	120	6	No shock. No sugar.
3/22/39	46	F	C	3.	**35** ACB	150	70	100	4	No shock. No sugar.
3/31/39	50	F	W	.6	**38** ACB	200	70	110	4	No shock. No sugar.
4/19/39	49	F	W	10.	**25** ACB	200	70	120	4	No shock. No sugar.
5/10/39	59	F	W	3.	**45** ACB	160	70	90	0	
5/29/39	60	F	W	.4	**25** ACB	125	70	110	0	
6/ 7/39	50	F	W	1.4	**10** ACB	120	75	75	0	
7/14/39	65	F	W	?	**10** ACB	140	60	70	0	Cholecystitis.
7/22/39	26	F	W	?	**25** ACB	150	70	120	0	Pregnant.
7/29/39	9	M	W	.1	**15** ACB	200	70	80	2	No shock. No sugar.
7/31/39	50	F	W	10.	**30** ACB	175	70	100	0	
8/ 2/39	48	M	W	17.	**40** 2 P.M.	200	50	125	1	No shock. No sugar.
8/ 7/39	55	F	W	?	**40** ACB	150	70	80	0	

LEGEND

Dates=Time protamine zinc insulin first started.
Black figures in tables=Protamine zinc insulin.
Light figures=Regular insulin.
ACB=Before breakfast.
ACD=Before dinner.
ACS =Before supper.
PCD=After dinner.

a patient taking one dose of protamine zinc insulin before breakfast. It should be noted that this curve shows normal blood sugars until 8 P. M. We do not consider the high blood sugar at this time of great importance if the rest of the four hour observations are within normal limits. Moderately high blood sugars in elderly individuals are considered safer than low ones because of the possible danger of coronary occlusion associated with the latter. We have also often found that patients tend to have lower curves after leaving the hospital and resuming their normal activities, very likely due to the effect of additional exercise. (On the charts, the figures circled indicate protamine zinc insulin.)



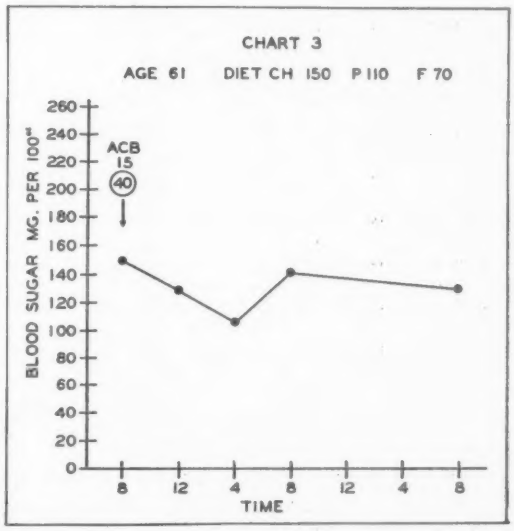


Chart 2 shows the blood sugar curve in a child, aged nine, taking one dose of protamine zinc insulin

TABLE II.—PROTAMINE ZINC INSULIN + REGULAR INSULIN BEFORE BREAKFAST

DATE	AGE	SEX	RACE	DURATION YRS.	INSULIN	DIET C	DIET P	DIET F	FOLLOW-UP MOS.	REMARKS
10/23/37	39	M	W	1.	15 30 ACB	160	60	100	21	15 ACB. 37 ACD. No sugar. Occ. mild shock.
11/13/37	17	M	W	5.	43 35 ACB	150	80	100	17	48 ACB. 50 4 P.M. Good control until 3 mos. ago.
1/14/38	52	W	W	10.	20 20 ACB	250	70	70	11	Accident. Out of control. Pneumonia. Now all right.
4/10/38	16	F	W	2.	30 55 ACB	250	65	100	13	20 ACB. No sugar. No shock.
10/17/38	30	F	C	.5	25 73 ACB	175	70	110	0	
11/ 3/38	58	F	W	10.	70 35 ACB	150	70	100	2	Gangrene. Died infected stump. No sugar.
11/11/38	50	F	W	.1	50 25 ACB	150	75	100	0	
12/13/38	60	F	W	18.	10 20 ACB	200	70	100	5	18 22 ACB. Neuritis. No sugar. No shock.
12/12/38	69	F	W	8.	10 25 ACB	150	70	100	0	Very unsatisfactory curve. Put back on regular.
12/13/38	64	M	W	10.	10 18 ACB	175	80	110	5	12 23 ACB. Satisfactory.
12/28/38	32	M	C	2.	10 48 ACB	250	80	130	5	No shock. No sugar. Osteomyelitis. Died 5/11/39. Out of control.
1/ 9/39	61	F	C	6.	15 40 ACB	150	70	110	0	
2/10/39	16	M	C	.1	25 60 ACB	250	70	100	5	No sugar. No shock.
2/22/39	53	M	W	10.	15 30 ACB	150	80	100	7	20 ACB. No sugar. No shock.
3/15/39	56	F	W	?	20 40 ACB	225	70	110	0	Died from Pulmonary Tuberculosis shortly after leaving.
4/25/39	50	F	C	.4	20 70 ACB	175	70	100	0	
5/12/39	56	M	W	.6	25 45 ACB	200	80	120	1	Slight shock. No sugar.
5/12/39	68	F	W	2.	20 40 ACB	175	70	110	0	
6/ 6/39	69	F	W	1.	10 50 ACB	160	70	110	0	
6/18/39	53	M	W	?	7 25 ACB	200	90	80	3	No sugar. No shock.
8/ 7/39	39	M	W	3.	30 100 ACB	200	70	110	0	Poor control.

before breakfast. This curve is considered quite satisfactory.

Table II gives the data for patients taking a dose of regular insulin plus a dose of protamine zinc insulin before breakfast. The protamine zinc insulin was often given immediately on arising and the regular insulin twenty minutes before the meal. No patient was placed on these insulins mixed in the same syringe as used by Lawrence.[3] Six of these twenty-one patients were given diets containing between 100 and 150 grams of carbohydrates and fifteen diets containing over 150 grams of carbohydrate in the twenty-four hours. Three were less than twenty years of age, four between twenty-one and forty, and fourteen over forty years of age. Six patients are considered to be under satisfactory control and one not satisfactorily controlled on this regime. One patient is now taking regular insulin and protamine zinc in-

TABLE III.—PROTAMINE ZINC INSULIN + REGULAR INSULIN OTHER THAN BEFORE BREAKFAST.

DATE	AGE	SEX	RACE	DURATION YRS.	INSULIN	DIET C	DIET P	DIET F	FOLLOW-UP MOS.	REMARKS
1/27/36	63	F	W	10.	24 ACB **20** 4 P.M.	200	80	80	39	**33** ACB. 10 12N. Occ. mild shock. Occ. sugar. Severe case.
5/18/36	18	F	W	5.	25 ACB 18 ACD **35** ACS	200	75	50	38	12 ACB. 10 ACD. Severe. Requires frequent **69** 2 P.M. adjustment. Mild shock.
6/15/36	23	F	W	10.	35 ACB **30** 3 P.M.	200	80	50	31	27 **42** ACB. Good control. Occ. shock.
7/22/36	22	F	W	12.	25 ACB 10 ACD **28** ACS	150	70	100	36	30 ACB. **35** 4 P.M. No shock. Occ. sugar.
11/ 1/36	51	F	W	8.	25 ACB **25** 5 P.M.	140	70	80	36	10 ACB. 10 ACD. Occ. shock. Occ. sugar. **28** 5 P.M.
11/ 8/36	24	F	W	8.	35 **25** 3 P.M.	200	80	80	26	27 **42** ACB. Mild shock. Occ. sugar.
11/18/36	58	F	W	9.	23 ACB **20** 3 P.M.	150	70	110	28	20 ACB. 10 ACS. Severe shock. Off protamine.
11/19/36	58	F	W	8.	28 ACB **30** 4 P.M.	150	70	100	36	Died Pulmonary Hemorrhage. Diabetes O. K.
11/30/36	65	F	W	3.	20 ACB **13** 5 P.M.	160	65	110	29	8 ACB. **11** 4 P.M. Mild shock.
12/ 9/36	57	F	W	0.	25 ACB **45** 4 P.M.	140	60	100	33	**10** ACB. Doing well. Operation Hyperthyroidism.
1/ 5/37	33	F	W	4.	25 ACB **30** 4 P.M.	200	75	115	0	
1/16/37	48	M	W	2.	22 ACB **35** ACS	180	70	110	33	Fair control. Now in hospital with infection and no control. Occ. shock.
1/21/37	16	M	W	5.	25 ACB **40** 2:30 P.M.	200	75	100	31	In hospital several times with acidosis. Now 28 ACB, **30** ACD. Good condition.
1/26/37	27	F	W	.4	25 ACB **30** 4 P.M.	180	70	120	25	Admitted in labor. Sent out on regular insulin.
1/30/37	24	F	W	1.3	15 ACB **28** 5 P.M.	150	70	120	28	Doing well until 5/27/39. **30** ACB. Showing sugar.
2/ 3/37	17	M	W	5.	22 ACB **30** 5 P.M.	220	70	120	26	18 ACB Mild Shock. **30** 1 P.M. Good control.
2/ 5/37	54	F	W	.1	18 **28** 5 P.M.	160	60	120	0	
2/22/37	25	M	W	4.0	25 ACB **25** 2 P.M.	220	70	125	0	
3/ 8/37	63	M	W	4.	22 ACB **20** PCD	175	70	120	30	Developed recurrent hyperthyroidism X-ray. Now on 30 **45**, both ACB. Occ. shock and sugar.
3/17/37	50	F	C	?	20 ACB **30** 2 P.M.	180	70	100	30	20 ACB. **20** 2 P.M. Doing fine.
4/17/37	48	F	W	12.	25 ACB **25** ACD	150	70	75	0	
4/23/37	52	F	C	1.	7 ACB **14** 4 P.M.	150	70	110	28	7 ACB. **14** 4 P.M. No shock. No sugar.
4/23/37	30	F	W	.6	15 ACB **25** 2 P.M.	170	70	120	0	
4/24/37	33	M	W	2.	18 ACB 15 ACS	150	75	120	19	No sugar. Mild shock.
5/ 2/37	59	F	W	1.	17 ACB **23** 2 P.M.	100	70	110	28	**20** ACB. Occ. sugar. No shock.

TABLE III.—PROTAMINE ZINC INSULIN + REGULAR INSULIN OTHER THAN BEFORE BREAKFAST.—(*Continued*).

DATE	AGE	SEX	RACE	DURATION YRS.	INSULIN	C	DIET P	F	FOLLOW-UP MOS.	REMARKS
5/ 2/37	43	F	W	10.	10 **12** 2 P.M.	150	70	110	15	Died heart failure.
5/25/37	72	F	W	2.	17 ACB **22** 12 N.	150	70	120		Died 1 week Carcinoma Cervix.
5/26/37	62	F	W	9.	12 ACB **18** 2 P.M.	150	70	120	27	10 **23** ACB. Good shape.
6/28/37	61	F	W	7.	12 ACB **20** 2 P.M.	150	70	110	10	No shock. No sugar.
7/18/37	32	M	W	2.2	20 ACB **25** 2 P.M.	150	70	110	24	Good shape. Restricted CH.
7/31/37	13	F	W	8.	28 ACB **60** 2 P.M.	200	70	100	25	30 ACB. **50** 2 P.M. Doing well.
8/ 3/37	53	F	W	?	15 ACB **40** 2 P.M.	150	70	100	0	
8/ 3/37	57	F	W	1.	10 ACB **20** 2 P.M.	150	70	110	16	24 ACB. **23** 2 P.M. No shock. Occ. Sugar.
1/ 3/38	52	F	W	17.	32 ACB **40** 12 N.	200	75	80	21	On regular. Did not do well on Protamine.
1/25/38	58	F	W	5.	20 ACB **30** 2 P.M.	170	60	120	0	
2/ 8/38	62	F	W	18.	20 ACB **38** 12 N.	Restricted CH			19	28 ACB. **38** 2 P.M. No sugar. Occ. shock.
3/12/38	48	F	W	7.	58 ACB **60** 12 N.	150	60	120	12	Died Heart Disease.
4/ 2/38	53	F	W	.1	25 ACB **35** 2 P.M.	170	60	120	16	10 ACB. **35** 2 P.M. No sugar. No shock.
4/20/38	60	M	W	15.	32 ACB **50** 12 N.	240	80	110	14	27 ACB. **52** 2 P.M. Occ. sugar. No shock.
4/20/38	24	F	W	10.	17 ACB **22** 4 P.M.	140	65	120	7	Carried through twin pregnancy and toxemia. Occ. shock.
5/ 3/38	63	M	W	.9	20 ACB **50** 12 N.	170	70	90	17	Gangrene. No sugar. No shock. Insulin same.
7/ 8/38	83	F	C	?	33 ACB **55** 2 P.M.	150	70	80	0	Died October 15, 1938.
7/13/38	65	F	W	2.	10 ACB **35** 12 N.	150	75	110	13	No sugar. No shock.
7/20/38	35	F	C	3.	20 ACB **42** 12 N.	175	70	100	11	**40** ACB only. No sugar. No shock.
7/25/38	11	M	W	2.	22 ACB **15** 1 P.M.	200	75	120	11	Stopped taking insulin 7/2/39. Died Acidosis 7/7/39.
8/ 1/38	64	F	W	?	30 ACB **30** 2 P.M.	200	70	120	0	
8/12/38	16	F	W	3.	10 ACB **60** 12 N.	250	70	110	0	
11/11/38	54	F	W	15.	45 ACB **50** 2 P.M.	150	70	120	6	Irregular in taking insulin. Showing sugar.
11/28/38	57	F	W	8.	30 ACB **25** 12 N.	150	70	100	10	20 ACB. No shock. No sugar.
1/ 9/39	14	M	C	3.	25 ACB **37** 2 P.M.	225	70	120	7	Doing well until recent cold. Now showing sugar. In hospital.
1/30/39	40	F	W	12.	10 ACB **45** 2 P.M.	150	90	70	0	
2/ 2/39	7	M	W	1.1	15 ACB **25** 1:30 P.M.	175	70	110	7	5 ACB. 5 1:30 P.M. No shock. No sugar.
2/26/39	67	F	W	10.	25 ACB **50** 2 P.M.	160	70	110	5	No sugar. No shock.

TABLE III.—PROTAMINE ZINC INSULIN + REGULAR INSULIN OTHER THAN BEFORE BREAKFAST.—(*Continued*).

DATE	AGE	SEX	RACE	DURATION YRS.	INSULIN	C	DIET P	F	FOLLOW-UP MOS.	REMARKS
4/17/39	63	F	C	.9	30 ACB **30** 2 P.M.	175	70	110	5	Occ. shock. Occ. sugar.
4/20/39	60	F	W	?	10 ACB **35** 2 P.M.	175	70	110	4	No shock. No sugar.
5/ 2/39	7	F	W	1.	15 ACB 5 4 P.M.	200	70	70	4	No sugar. Occ. shock at night.
5/ 6/39	19	F	W	?	20 ACB **66** 2 P.M.	175	70	100	4	**12** ACB, 5 4 P.M. 15 ACB. **70** 2 P. M. Slight trace sugar. No shock.
9/12/39	32	F	W	2.	20 ACB **60** 2 P.M.	175	70	100	-	No shock. No sugar.

sulin at times other than before breakfast and is under satisfactory control. One patient is now on regular insulin and not under control. Two patients have been placed on one dose of protamine zinc insulin before breakfast and are in satisfactory condition. Six patients have not been heard from and three are dead.

Chart 3 shows an illustrative blood sugar curve of an elderly patient on this regime. This is considered to be a very smooth blood sugar curve.

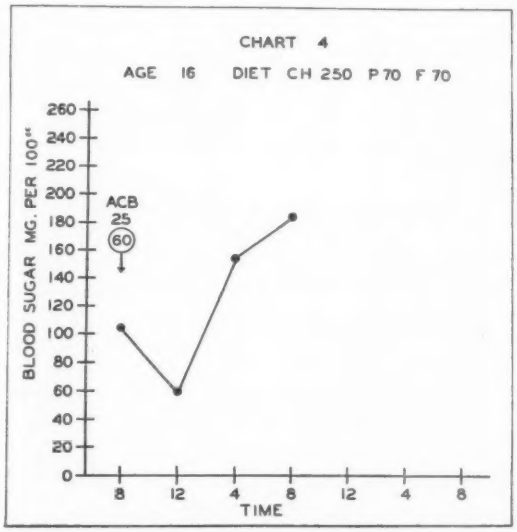
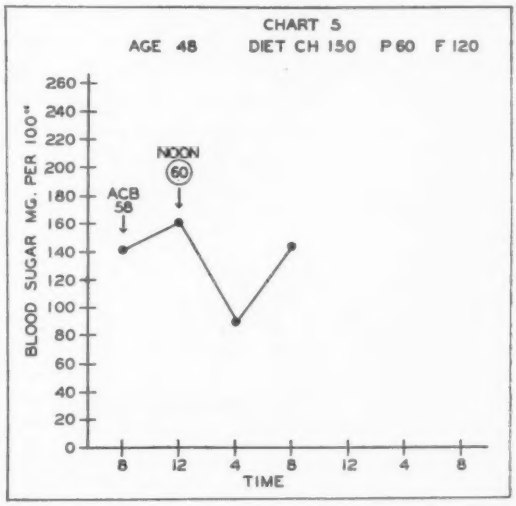


Chart 4 shows the blood sugar curve in a sixteen-year-old patient with regular and protamine zinc insulin given before breakfast. Only one blood sugar is above the normal level, that at 8 P. M.

Table III gives the essential data for patients taking regular insulin and protamine zinc insulin at various times during the day other than before breakfast. This constitutes the largest group of patients observed (58). The time of administration of both types of insulin was arrived at through a study of the blood sugar curves in each individual case. Twenty-five of these patients were given diets containing 100 to 150 grams of carbohydrate and thirty-three diets containing over 150 grams of carbohydrate. Ten were under twenty years of age, fourteen from twenty-one to forty, and thirty-four over forty years of age. Thirty patients are now under satisfactory control



on the same regime. One is not satisfactorily controlled, four taking regular insulin and protamine zinc insulin before breakfast are under satisfactory control, and three have been changed over to regular insulin alone and are considered to be under satisfactory control, three have been placed on one dose of protamine zinc insulin before breakfast and are

doing well, and six are dead. Eleven of these patients have not been heard from.

Chart 5 shows a satisfactory blood sugar curve in a forty-eight year old patient taking fifty-eight units of regular insulin before breakfast and sixty units of protamine zinc insulin at 12 noon.

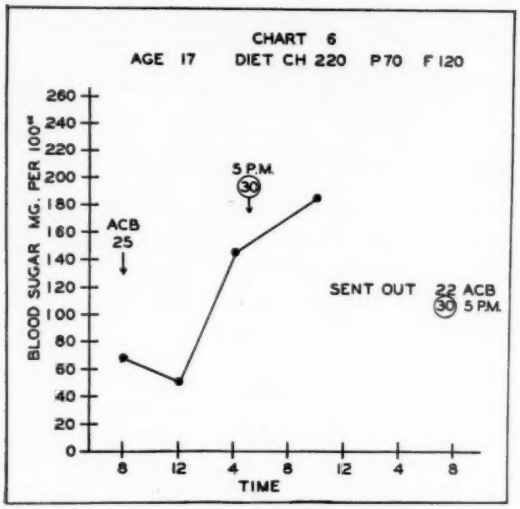
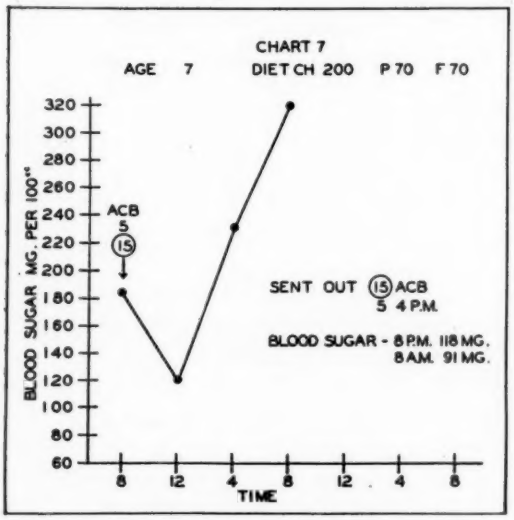


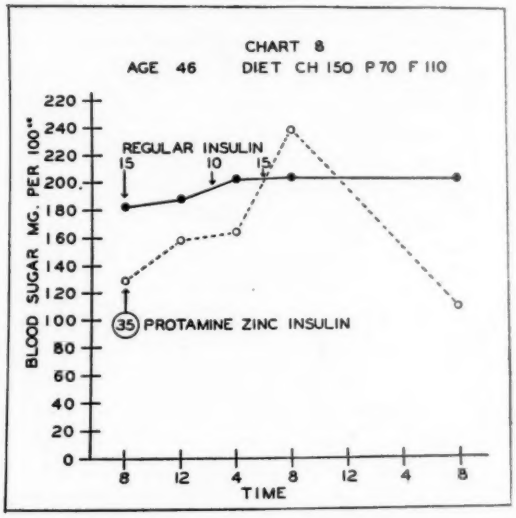
Chart 6 gives the curve for a patient put on twenty-five units of regular insulin before breakfast and thirty units of protamine zinc insulin at 5 P. M. As a result of the low blood sugars in the early part



of the day this patient's regular insulin was reduced to twenty-two units before breakfast and the protamine zinc insulin left unchanged.

Chart 7 gives a blood sugar curve in a seven-year-old child first placed on regular insulin and protamine zinc insulin before breakfast. This curve indicated a lack of control with high blood sugars late in the day and after supper. Subsequent adjustment with the protamine zinc insulin given before breakfast and regular insulin at 4 P. M. resulted in a normal blood sugar at 8 P. M. and normal fasting blood sugar the next morning.

Chart 8 shows an unsatisfactory curve in a patient taking three doses of regular insulin daily and subsequent control with one dose of protamine zinc insulin before breakfast with only one blood sugar above the normal level. It will be noted that fewer units of the latter insulin were required in this case,



which has been consistently observed in this series. This has been previously noted.

DISCUSSION

At first no patients were placed on protamine zinc insulin who were doing well on one or two doses of regular insulin. Now a good many patients are placed on protamine zinc insulin either alone or in combination without first trying them on regular insulin. All of these patients were on a liberal portion of carbohydrate as compared with the older type of diabetic diet. This has enabled them to select a more normal diet, they feel much better, and the psychologic effect is excellent. Furthermore, the food used in this type of diet is cheaper than that necessary in a low carbohydrate intake. In most cases the daily ration of carbohydrate was divided into three equal

portions. When the blood sugar curve showed low levels in the late afternoon with a high level after breakfast a division of the carbohydrate was occasionally made into one-fifth for breakfast, two-fifths for lunch and two-fifths for supper. A between-meal carbohydrate feeding was given where the blood sugar curve indicated that this was advisable, which was frequently the case in children. The fat in the diet was not higher than 120 grams (except in one case) which is probably near the optimum level as indicated by Watson and Wharton.[4]

In general the blood sugar curves were much smoother than those observed with regular insulin. Transient elevations of blood sugars above the normal were not uncommon. Due to the fact that this elevation of the blood sugar was often of such short duration, examination of the urine did not give a true picture of the situation. It is thought advisable that a study of the blood sugar at four hour intervals be made whenever possible. This should be done with the patient taking as normal an amount of exercise as is practicable, for blood sugars which are high with the patient in the hospital may be much lower outside.

Persistently low blood sugars were often found without any evidence of insulin shock and instances of severe reactions were rare. Many patients noted mild reactions which commonly occurred between breakfast and lunch. Apprehension, nervousness, weakness and sweating were the symptoms most often reported with these shocks. One or two patients complained of a headache in the early morning which was thought to be due to a reaction during the night. Low blood sugars were not often encountered after supper.

It is felt that no general rule can be laid down in regard to the optimum time of administration of protamine zinc insulin. In the milder cases of diabetes mellitus, found particularly in elderly people, a single dose taken before breakfast will suffice. In this series good results were obtained by giving regular insulin usually before breakfast and protamine zinc insulin at varying times during the day according to the indications derived from a study of the blood sugar curves. In a number of cases the blood sugar, particularly the fasting level, was variable even though the patient remained on exactly the same regime, which has been noted by others. This did not seem to be a serious disadvantage.

We feel that patients taking protamine zinc insulin can be better managed if they have a relatively frequent check up with a study of the twenty-four hour blood sugar curve. Slight variations from the normal may then be corrected by making minor adjustments, while a delay may result in a more serious lack of control.

SUMMARY

One hundred and thirty-six cases of diabetes mellitus treated with protamine zinc insulin alone and protamine zinc insulin plus regular insulin have been reported with an analysis of the results of treatment.

In many of these cases this long acting insulin seemed to be of definite value in their treatment, with resulting improvement in the patient's general status. Successful treatment was compatible with the feeding of a high carbohydrate diet.

In the individual case the time, the amount and the type of insulin was determined through a study of the four hour blood sugar curve.

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DISCUSSION

DR. JOHN B. MCKEE, Winchester: It has been a great pleasure to hear Dr. Mulholland's very excellent paper. He has reported a larger number of cases, of course, than most of us have an opportunity of seeing, and he has demonstrated how carefully and scientifically the diabetic can be controlled. There are several things which I want to discuss in regard to his paper, the first of which is what criterion we shall take as adequate control in the management of a diabetic on protamine zinc insulin. Of course, from a scientific and physiological standpoint, it is probable that a satisfactory blood-sugar curve is not only desirable but the correct thing. I feel that this is, however, for most of us definitely impracticable. In the first place, most men do not have the facilities for doing blood-sugar curves on all their patients; and, in the second place, most of the diabetics we have in northern Virginia are poor people. With us diabetes seems to be much more prevalent among the poor classes than among the upper classes. Consequently, not many of them can be hos-

pitalized, and with those that are hospitalized we have to take into consideration the hospital laboratory bill. The second consideration is, how important is the blood-sugar curve? I know Allen and his co-workers feel that the blood-sugar curve should be kept as nearly as possible at the normal level. Other workers, however, feel that hyperglycemia *per se* is not harmful and does not lower resistance to infection. The work of Jones, Stanhope (?), and others, has definitely proven that the phagocytic and bactericidal activity of hyperglycemic blood is as high as that of normal blood. Taking all these things into consideration, then, we have adopted control of the glycosuria as our criterion of satisfactory control of the diabetic. In other words, we take four specimens of urine a day, and if not more one of those specimens shows glycosuria of not over one per cent we feel that the patient is satisfactorily controlled, regardless of what his blood sugar might be. I think that this method can be carried out satisfactorily by the general practitioner, and it is much simpler and easier for the patient and entails much less cost.

As far as the dosage is concerned, we have used very much the same type of management that Dr. Mulholland has described. We have been able to control most of our diabetics, particularly the older ones, by one dose of protamine zinc insulin daily. Those individuals that could not be controlled in that way were given a dose of regular insulin, usually in the morning. Occasionally it was felt advisable to give a dose before the evening meal.

With the method of shifting the protamine dose around I have had no experience. I noticed a report in a recent number of the *Annals of Internal Medicine* that Rabinovitch had given protamine zinc insulin at various times of the day and found that the lowest blood sugar was always between 3 A. M. and 7 A. M., regardless of what time the protamine zinc insulin was given, so I think that this point is not very important.

The biggest trouble we have had has been with shock. Of course, our criterion for regulation is not nearly so strict as Dr. Mulholland's, but we have had very little difficulty so far as control of the diabetic situation has been concerned. Our greatest difficulty has been with insulin shock, particularly with our first patients. We would send them out of the hospital apparently perfectly controlled and they would get along splendidly for maybe five or six days or a week, and then we would get reports that they were having difficulty with shock. We had two patients who had very peculiar manifestation of shock. They would develop symptoms very suggestive of severe polyneuritis, which were promptly relieved by decreasing the insulin dosage precipitated again by increasing it. I had never seen this before, but these patients apparently developed severe neuritis from insulin.

We have developed the policy of getting the patients up in the hospital in the morning and having them take a long walk in the morning and afternoon, in order to get them under control while taking an amount of exercise such as they would take at home. They left the hospital spilling a trace of sugar. Since instituting this regime we have had no further trouble with shock.

I have enjoyed Dr. Mulholland's paper. I wish my diabetics were as well controlled as his, but I believe that for myself (and probably for most of us) control of the glycosuria is sufficient. I should like to ask Dr. Mulholland whether or not he agrees.

DR. WILLIAM R. JORDAN, Richmond: I should like to say two things about the use of protamine insulin. The first is that it has one advantage over regular insulin, so far as I know, and only one, and that is that it is more convenient. It can be given as one injection instead of several, which you had to use with the old insulin; but sometimes, of course, it must be supplemented by the regular insulin, as Dr. Mulholland pointed out. Since convenience is its only advantage, it seems to me improper to use it at an inconvenient time of day, such as noon or 2 P. M., unless control of the diabetes can be maintained in no other way. Children are at school, and it is inconvenient for them to take it then. The same thing is true of men, who are at business, and of women, who are often shopping down town.

Dr. McKee said he had one trouble with insulin, and that is shock. He also said that he did not think it necessary to take the blood sugar of these patients to control them. I do think that by taking the fasting blood sugar on these patients before breakfast we can detect a low blood sugar and can go ahead and do something to prevent clinical shock. I have known one patient who had a blood sugar of 170 and 180 mgm. before breakfast and had no glycosuria at all. She was booked for a perineorrhaphy and because of this blood sugar was given a total of 54 units of insulin in a day. The net result was that her blood sugar before breakfast had been reduced 10 mgm. only and she was having clinical reactions at from two hours after lunch until supper and from two hours after supper until she went to sleep. The result was that the wound broke down. We left off the insulin, and the wound healed. The doctor forgets that the blood sugar is a very vacilating state. Unless we take into consideration that the blood sugar changes rapidly and frequently I do not think it is worth while taking the blood sugar, except for diagnosis.

DR. MULHOLLAND, closing the discussion: I wish to thank the gentlemen for their discussions.

In answer to Dr. McKee's question in regard to treating these patients without determining the blood sugar curve, I think it can be done, but I believe that one will observe the difficulties he has mentioned in his discussion, namely, that they are likely to go into shock more frequently. Conversely, and this is important, is the elderly diabetic with high blood sugars and no sugar in the urine. I have recently had such a case with severe neuritis and blood sugars ranging over 200 mg. throughout the twenty-four hours. This situation, of course, could not be picked up without running a twenty-four hour curve, and I believe that cases should be controlled by such periodic observations wherever possible.

Dr. Jordan states that the only advantage of protamine

zinc insulin is its convenience and that when one has to give this insulin in the middle of the day, such a time is inconvenient. I believe that it has many more advantages than that. Most of the patients feel much better, have a great deal more energy and, in our experience, take less insulin and fewer doses. Some of these individuals who are now taking protamine zinc insulin at noon or at other times during the day have been on four and occasionally five doses of regular insulin. In addition to reducing the number of doses we are usually able to give them so that they do not seriously interfere with any of the patient's normal activities. Because I believe that it has many advantages, I am now treating very few patients with regular insulin alone.

EARLY MYOCARDIAL INSUFFICIENCY.*

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Norfolk, Virginia.

There is an increasing appreciation that the functional state of the circulation and the cardiac reserve are more important than the structural changes the heart undergoes in disease. The proper management of many present and future cardiac patients depends on the correct appraisal of heart ability.

The inability of the heart muscle to accomplish its work may be roughly divided into two stages—early and late,—the early being the stage of symptoms, and the late being the stage of signs. This later stage of signs is the definite symptom-complex of circulatory embarrassment known as congestive failure, and seen in many degrees of severity.

The early stage of symptoms is a less definite entity because of lack of exact diagnostic criteria. It frequently goes unrecognized and untreated for some time. It is a state of diminished heart reserve.

The full extent of the normal heart's reserve power is hard to comprehend. What the heart is called upon to do under resting conditions is only a small fraction of which it is capable. Maintaining the body at rest requires about one-tenth of the normal heart capacity for work. The remaining nine-tenths capacity forms the reserve. Consequently, in considering all stages of myocardial failure, we must realize that by the time actual clinical failure sets in, nine-tenths of the heart's capacity to perform its tasks has been lost. For this reason, early recognition often means prevention, temporary at least, of clinical failure, which is of far greater benefit than its later treatment.

In addition to those with symptoms of diminished heart reserve, consideration of this subject affects two other divisions of heart patients:

First, those with potential heart disease. This refers to those who have had some disorder which usually leads to the development of cardiac insufficiency, but who totally lack signs and symptoms of heart disease. It would include all who have had rheumatic fever, or inadequately treated syphilis, those with severe hyperthyroidism, hypertension, arteriosclerosis, or chronic pulmonary fibrosis.

And, second, those with asymptomatic heart disease. This division includes those carrying definite signs of some cardiac disorder, but able to lead a normal life without any symptoms referable to the heart. It would include those with murmurs of organic heart disease, those with congenital abnormalities, or with heart enlargement from any reason.

These three divisions, potential heart disease, asymptomatic heart disease, and early myocardial insufficiency, constitute progressive stages of functional changes through which the majority of cardiac patients pass.

Since the rate of progression of many of these original heart conditions is usually slow, myocardial insufficiency frequently does not occur until some added factor is present. The most common of these precipitating factors are infection, exertion, obesity, anemia and emotional upsets. With freedom from these disturbances many patients continue apparently well for years, although affected with serious cardio-vascular disease. One exception is luetic heart disease which is usually progressive without intermission.

History: In beginning insufficiency objective signs are frequently lacking, so it is obvious that the story of the patient is important. A carefully taken history often reveals weakness of myocardial function before there is any positive evidence of the condition from physical or laboratory examinations.

Symptoms and Signs: Dyspnea: This is un-

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doubtedly the most important symptom in all heart disease. Cardiac dyspnea while at rest practically signifies failure, while if only present with exertion there is a much lesser degree of heart reserve loss. There are many causes for dyspnea other than diminution of the heart reserve. First, it is perfectly normal for healthy individuals to be dyspneic if they exercise sufficiently. Tolerance to exercise varies considerably depending on obesity, habits and general physical condition. There is also to be distinguished the dyspnea accompanying chronic bronchitis, bronchial asthma, emphysema and related conditions, that due to bronchial or mediastinal obstruction, effort syndrome, or that due to the aging factor.

In cardiac insufficiency the individual frequently first develops dyspnea on walking level or up a slight grade, or performing small daily tasks. Increasing respiratory discomfort progresses as the heart reserve diminishes. It should be emphasized that once established, dyspnea of exertion usually persists. It may improve materially following proper therapeutic measures, but rarely disappears entirely. Lewis[1] has called attention to the fact that cardiac dyspnea should be graded, not by the degree of distress, but by the amount of physical effort producing it.

Tachycardia: Tachycardia is generally a serious sign and every effort should be made to discover the origin. It can only be tolerated for a limited time, before the extra energy expended finally decreases the cardiac reserve. When connected with heart enlargement, there is exceptional danger of fatigue and subsequent early insufficiency.

Palpitation: This occurs in such a large variety of extra-cardiac and cardiac conditions as to make it unimportant as a specific symptom. Its main help is in alarming the patient to the extent of seeing his physician.

Substernal and epigastric pain: In beginning insufficiency this type of pain only occasionally appears before dyspnea, but frequently occurs later. It is rarely precordial. When first occurring there is merely an uncomfortable feeling or slight distress. It is typically brought on by some unusual activity, or after a heavy meal. It starts only as a result of some activity and is relieved by rest. Some learn this and obtain relief by retarding voluntary activities before the pain or dyspnea occurs.

Gastro-intestinal symptoms: An engorgement of the liver, spleen, and stomach mucosa will cause flatulence and epigastric distress, sometimes nausea. If due to myocardial insufficiency, this symptom will appear only upon activity, and disappear with rest. When symptoms are referable to the gastro-intestinal tract, the degree of failure has usually passed beyond the early stage and other symptoms and signs are present.

Enlargement of the heart: Enlargement and dyspnea on exertion are the two important manifestations of early myocardial insufficiency. While dyspnea is the result of waning reserve, enlargement is brought about by some original underlying disorder, and may be present for years asymptomatically. It is due to either hypertrophy or to dilatation, the former being thought to be dependent on overwork over a period of time, and the latter being the immediate response of the heart to an increase in work. In addition to underlying cardio-vascular disease causing enlargement, there are extra-cardiac conditions such as anemia and vitamin deficiencies. Enlargement of the heart can often be determined by palpation, percussion, and inspection methods, but for greater accuracy, X-ray methods are used.

Edema is not present in early insufficiency. Most of the heart conditions causing myocardial insufficiency first impose a left side strain on the heart, and it is to be expected that dyspnea and pulmonary congestion will precede systemic edema. Right-sided strain usually follows, but by the time edema has occurred, the significance of early insufficiency has been lost and a further and more permanent degree of failure has set in. Some conditions involve right ventricular strain first, with resulting early edema, but these are the results of mechanical hindrance to the action of the heart, and lead to a mechanical heart failure rather than to one of myocardial origin. Such examples are constrictive pericarditis, congenital malformation and tricuspid disease, and chronic pulmonary disease.

Cough and cyanosis also occur later than dyspnea, and are usually not of value in recognizing beginning myocardial insufficiency. Irregularities may or may not be present. Blood pressure changes are not of diagnostic value.

Diagnosis: Early myocardial insufficiency is not hard to recognize when exertional dyspnea appears in asymptomatic or potential heart disease. When in combination with other conditions, the differential diagnosis is difficult, and in any case suspicion should be felt when the history reveals dyspnea on

exertion, or examination shows heart enlargement.

In addition, some of the following procedures are quite useful:

X-ray: The importance of X-ray study is obvious because enlargement of the heart is frequently the early objective sign in early insufficiency cases. While fluoroscopy is of value in studying the underlying heart disease, the teleroentgenogram is more useful because of accuracy in measurement. Peculiar shaped chests and various statures causing abnormal positions of the heart, are factors of error in measuring the silhouette. Some observations[2] recently reported concern the status of the four heart chambers as interdependent units, rather than the heart as a whole. By means of oblique views and the added help of barium in the esophagus, the enlargements of each chamber can be made out accurately.

Electrocardiogram: Tracings showing poor myocardial conduction, correlated with X-ray findings of enlargement, and history of exertional dyspnea, are a triad diagnostic of early myocardial insufficiency. Subclinical heart patients enjoying normal activities may or may not show myocardial electrocardiographic changes. Further, it is important that a normal tracing should not cause definite or suggestive clinical observations to be disregarded.

Venous pressure: The systemic venous pressure is easily determined by arm venipuncture. It gives an accurate measurement of systemic engorgement as a result of right-sided heart failure. But by the time failure is right-sided, the stage of early myocardial insufficiency has usually progressed to the stage of signs, and objective evidences of failure are easily discerned. Increased venous pressure is not pathognomonic of right-sided failure since it is also increased in any obstruction to venous return flow, as in mediastinal tumors, and when the heart is mechanically unable to accommodate the venous blood, as in constrictive pericarditis. Therefore, it is only of value in early insufficiency in correlation with other tests and findings.

Vital capacity: This is a measure of the air capacity of the lungs under standard conditions. Vital capacity is diminished when congestion of the lungs is present in any degree. This test is valuable because it demonstrates lung congestions even before dyspnea or any respiratory distress has appeared. This would seem to make it important in distinguishing early myocardial insufficiency. But, besides being abnormal in circulatory inefficiency, vital capacity is also diminished in certain pulmonary and mediastinal conditions, hyperthyroidism, and in any poor physical condition. Consequently, although not pathognomonic of early insufficiency, it is of great use along with other findings. After proper diagnosis in any given patient, it is a splendid index to the stages of myocardial insufficiency when serial records are kept.

Cardiac output: Simple clinical methods of this determination are not available. There is no general agreement among observers whether volume output is changed in any of the various stages of heart failure. Harrison[3] feels there is probably no alteration in cardiac output, but a change in the relationship of output to venous pressure, which in turn finally causes fatigue.

Circulation time tests: The efficiency of the circulation determines the blood velocity, without relation to the type of original condition affecting the heart, such as hypertension or fibrillation. Further, the circulation time is unrelated to weight, height, blood pressure, or pulse rate. This makes it the simplest single test of efficiency, or function, available, so it is of considerable value in distinguishing cardiac dyspnea from other conditions leading to breathlessness. It is roughly increased according to the degree of myocardial insufficiency, while remaining normal in several conditions which the other tests mentioned cannot distinguish from myocardial insufficiency. It is normal in bronchial asthma, bronchial compressions and mediastinal tumors, uncomplicated emphysema, and shortened in hyperthyroidism. The circulation time is found to be increased, in addition to myocardial insufficiency, in myxedema and polycythemia, which are not differential diagnostic problems.

The circulation time tests are quite simply performed in the office or home. You are referred to the literature for details. Necessarily each end-point site has a different significance. For instance, the functional capacity of the circulation as a whole is roughly measured by the arm-to-tongue time, that of the right ventricle by the arm-to-lung time, and that of the left ventricle by the lung-to-tongue time (subtraction).[4] An objective rather than subjective endpoint is to be desired, in any procedure, but the sudden intensely bitter taste of decholin in the arm-to-tongue test is so startling as to be completely satisfactory. Magnesium sulphate[5] is probably as satisfactory and less expensive. Examples of strictly ob-

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jective end-points are obtained in the arm-to-carotid sodium cyanide test (sigh), and the arm-to-lung ether method (smell of ether). It is well to be familiar with one of each type of these circulatory time tests because of their value in the differential diagnosis of myocardial insufficiency, early or late.

Exercise tolerance tests: Any simply performed exertion test eliciting increase in pulse rate, or blood pressure, or breathlessness, is supposed by many to be a measurement of circulatory efficiency. Hopping, stepping back and forth from a chair seat, up and down steps, weight lifting, all for a certain interval or number of times, are means of investigating tolerance to exertion. But it must be pointed out that many patients with extra-cardiac disease, obesity and various other conditions react poorly, so these tests merely determine whether generally fit, and are not specific for efficiency of heart function. Considerable care must be exercised in applying them to the study of the circulation, for normal responses can be obtained in early myocardial insufficiency where there is a fair amount of reserve, and, conversely, abnormal responses do not differentiate circulatory inefficiency For proper evaluation of such tests, one should adopt some one modification, standardize it to his requirements and learn to interpret the results, remembering that it is only a general test of fitness.

Life insurance companies, for simplicity, use some forms of exercise tolerance tests in trying to eliminate early myocardial insufficiency cases. Correspondence with a number of chief medical examiners shows that when in further doubt, there is a general acceptance of the teleroentgenogram and electrocardiogram for additional information. None have found it practical or of value to use vital capacity or venous pressure tests; one mentioned circulation times; many are experimenting with various tests[6] such as the flarimeter, but all realize the complexity of the forces which apply to so-called functional tests of the circulation.

The *treatment* of early myocardial insufficiency is to prevent progression. If instituted before irreversible changes of actual failure occur, there is ample opportunity for a long and self-sustaining life. Periodic health examinations should assist in the detection of this condition. In persons who have heart symptoms only on effort, the therapeutic aim is to prevent the additional occurrence of these symptoms while at rest, thus postponing as long as possible the almost inevitable heart failure. Control over infection particularly, obesity, and other precipitating factors will aid considerably.

In all stages of myocardial insufficiency rest is the most important single therapeutic measure available. To be effective, it must be complete, mental and physical. In early insufficiency, prophylactic bed-rest over week-ends, with increase of daily bed-rest hours, acts to prevent progression.

Exercise or physical exertion can be allowed to a point below the occurrence of dyspnea, because the early insufficiency patient has a diminished reserve rather than a depleted one. Davis,[7] of Boston, points out that exercise and rest are opposing forces, an exercise regime only being useful when enough reserve is present to allow the disappearance of symptoms. The use of graduated exercises in heart patients should therefore be carefully limited to quite early insufficiency. Reserve myocardial strength is never completely regained when lost, because of continued cardiac activity, as compared with the skeletal muscles which can be fully rested and replenished between exercises.

Nutrition: Early insufficiency usually requires normally balanced servings. Temporary relief of the circulation can be provided by lowering the patients metabolic status through partial starvation. Whenever necessary there must be correction in obesity and anemia, reduction in over-indulgence, and restoration of vitamins.

Specifics: The only specifics to be considered are thte replacement of vitamin B_1 and of thyroid extract where indicated.

Drugs: The essential action of digitalis on the heart is to increase its efficiency, and it should be used in preventing, as well as in combating, congestive heart failure. For some years Christian has advocated sub-effect digitalis in elderly people without heart enlargements, but in whom circulatory efficiency is lessening. This is in accord with recent work by Harrison and others,[8] showing that cardiac dyspnea on exertion can be abolished, or diminished, with digitalis. It can be used to advantage in sub-effect doses in those reduced to minimum activity, who have beginning dyspnea. Also, patients who have recovered from congestive heart failure practically always continue some dyspnea on exertion, and sub-effect or maintenance digitalis should not be withheld from them.

The value of the xanthine-purine derivatives in dyspnea without obvious edema is not sufficiently

recognized. The mechanism effect is not clear, it possibly reducing edema of the heart muscle, or the small amount of fluid in the pulmonary alveolar walls.[9] In early myocardial insufficiency of hypertensive origin where digitalization is not indicated, the xanthine derivatives are useful, with or without a sedative combination.

Quinidine is mentioned only in regard to its proper rationing in treating some of the underlying causes of early insufficiency.

A major part of the treatment of early insufficiency is proper mental adjustment. Asymptomatic or potential heart disease often precedes the symptom stage by many years, unknown to patient or physician. Progression beyond an early stage can be hindered, first, by education in preventing precipitating factors, and, second, by conservation of the heart reserve. This requires complete frankness with the patient. Tuberculosis could never have been controlled except through education of many laymen in its symptoms, treatment, and precautions. And the goal of prevention and relief of heart disease will never be solved by the medical profession alone. Even the very nervous and apprehensive patient can be harmlessly told enough of his condition to get his cooperation. In addition, it is absolutely necessary that we hold out hope to every patient who comes to us, or all other methods are futile. Intelligent mental and physical adjustment to restrictions can be made to result a useful economic existence, and a life of enjoyable activity.

CONCLUSIONS

1. Early myocardial insufficiency is a functional state of diminished heart reserve often unrecognized and untreated.

2. Exertional dyspnea and heart enlargement are its only important clinical manifestations.

3. Severe exercise tolerance tests can eliminate early myocardial insufficiency, but cannot differentiate its presence from other conditions.

4. Circulation time tests are probably the nearest approach to an efficient test of circulatory function.

5. No single symptom or test distinguishes impairment of circulatory function.

6. Exercise can be tolerated in the presence of sufficient heart reserve but is not beneficial.

7. Mental and physical adjustment should be fully individualized.

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DISCUSSION.

DR. T. DEWEY DAVIS, Richmond: Dr. Adams has covered the details of this subject so thoroughly that I am going to confine my remarks to two aspects of the situation, the first of which is the diagnostic aspect. He has called attention to the fact that exertional dyspnea and enlargement of the heart are the two major manifestations of early cardiac insufficiency. Unfortunately, dyspnea is a common manifestation of functional heart disease. All of you are thoroughly familiar with that. Therefore we have to analyze our dyspnea and study the individual; we have to study what the individual calls dyspnea rather than accept it as a fact that he is short of breath. I see patients frequently who complain of being very short of breath, and in talking to them notice that they are continually sighing, and they call that shortness of breath. We have to co-ordinate all the various factors to determine whether we are dealing with functional heart disease or dealing with an early organic heart disease. It seems to me that it is very necessary to do this. I have seen patients, and I am sure all of you see them, who have been treated for organic heart disease but whose symptoms are entirely functional in origin. They have been given digitalis. Most laymen know that digitalis is a heart medicine, and if they take it they get it firmly fixed in their minds that they have heart disease and they get even more sick in their functional state. Of course, it has to be recognized that obviously neurotic patients can have organic disease.

As Dr. Adams emphasizes, we have to handle these patients tactfully and have to make them behave. We have to make them take the proper rest, which is by and large the most important part of the treatment, that rest being physical as well as mental.

DR. PAUL D. CAMP, Richmond: I enjoyed Dr. Adams' paper and also Dr. Davis' remarks on it. I think what Dr. Davis said about the differential diagnosis of these functional cases, the so-called effort syndrome or neuro-circulatory asthenia, is very important, and each case must be gone into in great detail and studied as an individual and not just as a case. The exercise tolerance is, of course, very important. That, again, must be carefully judged. Enlargement of the heart, I think, is certainly of very great importance, and I do not think we would be justified in saying that a case is purely neuro-circulatory asthenia or effort syndrome if we find a definite cardiac enlargement. Of course, any case of organic heart disease may have engrafted upon it a very definite neuro-circulatory asthenia. For instance, angina pectoris or coronary thrombosis may have engrafted upon it a very definite neuro-circulatory asthenia after the patient has gotten over the acute stage.

In regard to the fluoroscope and X-ray, I believe the orthodiagram is just as accurate as a seven-foot teleoroentgenogram, although others may differ with me on that.

There is one other thing which I should like to mention, although it does not come under the head of actual early insufficiency. If such a condition is present, however, we may assume that in the vast majority of cases the patient will develop an insufficiency. This condition is the murmur of aortic regurgitation and of mitral stenosis. Systolic murmurs, of course, occur in neuro-circulatory asthenia and sometimes make it a little harder to make a differential diagnosis but are of no great importance so far as the prognosis is concerned. But the heart that shows a definite aortic regurgitation, even though the patient has had no symptoms of it before, or with definite mitral regurgitation with a supposedly well-functioning heart muscle, will usually in the end show some evidence of myocardial insufficiency.

There was one other thing I wished to mention in regard to the early insufficiency. This really does not come under the head of early insufficiency if the patient is intelligent and if you can get a reasonably intelligent history, but at times I certain believe that mild angina pectoris of effort might show up without a definite dyspnea on exercise and without any enlargement of the heart, and those cases, of course, can be brought out by going into the history very carefully. I am quite sure that in some cases they will complain of slight substernal pressure brought on by exercise and relieved by rest, without having any appreciable dyspnea on exertion.

DR. FRANKLIN M. HANGER, New York City: I was very much interested in some of the problems Dr. Adams brought out. There are one or two additional procedures which may be of value in detecting early myocardial insufficiency. A technique introduced by Caughey at the Presbyterian Hospital has proved most useful. It consists of increasing the patient's blood volume by giving 1500 cc. of normal saline intravenously during a thirty-minute interval and noting, at the same time, the venous pressure. A normal heart handles this increased load without significant rise of venous pressure; however, a rise above 100 mm. of H_2O indicates diminished cardiac reserve. It is a very simple test and the patients suffer no discomfort. It puts a functional load on the heart which is measurable and is under constant control. By means of it, patients with certain circulatory disturbances can be differentiated from those with organically weak hearts.

Another method to recognize organic cardiac disturbances, especially those accompanied by cardiac pain, is by having the patient breathe an atmosphere low in oxygen. The partial anoxemia frequently brings out the pain which the patient recognizes as his familiar complaint. The procedure sounds perilous but in competent hands is attended by but little risk. It is especially recommended to distinguish organic from functional cardiac pain.

DR. WALTER P. ADAMS, closing the discussion: I think it is very interesting to have been told about this saline test, which, of course, is familiar to a great many of us, and is used only in hospitals. I have become particularly interested in the circulation time, which can be used at the bedside, in contra distinction to what Dr. Hanger brought out. It seems to me that while there is no one test of function, the circulation time would be the best simple test.

THE CARE OF THE SICK CHILD.*

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The care of sick children constitutes a large part of the average physician's practice. For this reason the following has been written in an attempt to clarify the general rules for the proper care of that group.

The physician is responsible for giving specific instructions to the mother. Too many physicians examine the child, prescribe one or more medications, and leave the mother with no instructions as to the general care of the child. Such vague orders may,

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I wish to express my gratitude to Dr. Charles Hendee Smith for his suggestions in the preparation of this paper.

for example, call only for nose drops every four hours and a warm salt water gargle every two hours, with no special reference to food except that the child "may have a light diet" or that "fluids should be forced". As a result of this omission the child will be disturbed much more often than necessary and, in addition, will usually receive unsuitable food at irregular hours. It is the physician's duty to leave definite written directions concerning these matters.

The following simple rules seem important but are all too rarely explained with care.

The sick child should have his own room. In general, the room should be bright and cheerful, unless contraindicated by the type of illness. The patient's bed should be so placed that the child has a full view of the room with the best possible light, but with no glare in his eyes.

Fresh air regulation should be governed by the temperature of the outer air, the season, wind direction, and the situation of the room. It is foolish to say that the window shall in every case "be lowered from the top six inches", or to make any dogmatic statement in that regard. For example, in some sections of New York City, on the river front, the wind velocity is so great that practically no opening of the window is necessary during the winter months, while in other parts of the same city the windows may be opened wide with great benefit. Whenever possible the window should be opened at both top and bottom. The room should be thoroughly aired several times each day. This may be done while the child is asleep or lying down and well covered. The temperature of the room should be regulated at about sixty-eight degrees Farenheit, if possible. This will often seem a little cool to one sitting in the room without a wrap. If the room is too cool, the nurse or mother should be warmly dressed in order to avoid chilling and resultant respiratory infection.

The patient, also, must be protected from chilling. Even during the summer months the sick child should not be left entirely without covering. This is particularly true as regards infants. A sudden change in temperature will often lead to chilling and thence to further complications. The sleeping bag, made of outing flannel, Canton flannel, French flannel, or of sheeting in warm weather, offers an excellent covering for the infant (See Figure 1). It provides freedom of motion for both arms and legs and, at the same time, keeps them well covered. Additional clothing to be worn under the sleeping bag must be determined by the weather. An undershirt, diaper and waterproof diaper cover are enough as a rule. During warm weather the shirt may be omitted. Additional blankets, put over the sleeping bag when necessary, are easily kept in place. No other arrangement insures the infant against kicking off the bedding.

Fig. 1.—Sleeping Bag. The sleeping bag of cotton or French flannel keeps the baby warm and secure. Blankets tucked over it cannot be kicked off, and the baby cannot suck his thumb.

Fig. 2.—Comfortable Child. This child has a back rest, a bed jacket, and bed table. The small toys and the picture book suggest play at rest. Result: warmth, rest, and happiness!

Older children should wear the usual pajamas or nightgown, and, in addition, a sweater, sack, or wrapper when sitting up in bed.

The sick child is usually not hungry. This is true even if he has only a moderately severe respiratory infection or other mild febrile disease. This lack of

appetite is often a cause of consternation in the family circle, and unwanted food is forced upon the child. The physician should warn the parents at the outset that the child will probably not eat as usual for the duration of the illness. He should assure them that this is not a matter for worry, but is rather the normal response.

A child with much fever will not tolerate a regular diet. A child with a temperature elevation of 102 degrees Farenheit or above must be given a light diet. The best foods for the sick child are milk toast, soup, cereal, fruit juice and ice cream. These are usually sufficient. There may, however, be some substitution. For example, Jello may be used to replace orange juice. Simple puddings, such as cornstarch, arrow root or blanc mange also may be substituted.

It is preferable that the child be given small amounts of food at regular and more frequent intervals. A three hour schedule is best adapted to the acute stage of the illness, because one more light feeding is possible during the day than on the four hour schedule. Nourishment and medications are given on the same schedule so that the child may be given time to rest. The distribution of food is elastic. The following is an example of a suitable diet for a child with fever.

6-7 A.M. Orange juice.
10 A.M. Cereal and milk (small amount).
1 P.M. Soup and cracker or toast.
4 P.M. Ice cream (small portion).
7 P.M. Cereal or milk toast.
10 P.M. Orange juice or soup and cracker.

If the illness is a prolonged one, e.g., typhoid fever, the diet may be gradually increased so that the patient eventually receives a high caloric diet. Even in these cases the addition of food must be slow and the appearance of distention, diarrhea or vomiting is a signal for immediate return to the light diet. After a reasonable wait the gradual increase may again be attempted.

In the case of the acutely ill small infant, all solid food should be discontinued and the formula diluted to one-half strength. Prolonged illness is treated on the same principle as noted above.

All medication and other therapeutic procedures should be grouped together with the nourishment and determination of body temperature at three hour intervals in order to allow the patient the maximum amount of rest. The written directions for the mother should read something like the following:

Every three hours:
1. Take temperature and record it.
2. Give necessary treatment.
3. Feed (definite schedule as above).
4. Give medicine.
5. Let child alone for three hours.
Water may be offered if patient is awake. Do not disturb otherwise.

The matter of adequate rest is an all important one to the welfare of the sick child, and this cannot be achieved if the patient is to be bothered at frequent and irregular intervals for taking his temperature, for food and for medication.

It should be stressed that the sick child must have a stool each morning. A mild laxative, such as Aromatic Cascara or Milk of Magnesia, will practically always be sufficient to bring this about, but a sick child usually needs one of these every night. If the laxative is not effective in the morning an enema will be necessary. Whatever the needed procedure, no forenoon should be allowed to pass without adequate intestinal elimination. If the nurse waits until night the fever is usually higher and the struggle over the enema more exhausting.

Fig. 3.—Uncomfortable Child. This is the way children are "put to bed" in some homes and in some hospitals. The feet are cold and there is no back rest, the toy is one which suggests motion and playing on the floor. Result: chilling and unhappy expression!

Every sick child should be provided with an invalid table upon which the patient may play with his toys and games. This is especially useful during the convalescent stage. For such play the child's back must be adequately supported either by means

of a backrest or by several pillows (See Figures 2 and 3).

The convalescent child requires entertainment, and it is the physician's place to suggest recreation which will provide amusement without unnecessary taxation of the patient's strength. Older children are not usually quite so difficult to please, but the runabout child, from age two to six years, requires constant amusement. For such a child the parent may purchase a "grab-bag", composed of ten to twelve different toys, each of five to ten cents value. Every hour or two the child is given one of the new toys. This will usually serve to keep him amused throughout convalescence and at a reasonable expense. Even the sick child may play quietly on his bed-table with simple, unexciting toys.

SUMMARY

The physician should give special attention to the temperature, air and light of the sick room. Body temperature determination, nourishment and medication should be grouped together on a regular three hour schedule. A mild laxative is usually needed every night and an enema may be necessary in the morning. Recreation for the convalescent is important.

THE INCIDENCE AND SIGNIFICANCE OF SHOCK IN PATIENTS WITH ACUTE HEAD INJURIES, WITH SPECIAL REFERENCE TO THE PREVENTION OF POST-TRAUMATIC INFECTIONS.*

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INTRODUCTION:

The main purpose of this presentation is to demonstrate the *low incidence of shock in acute head injury cases* and to stress the importance of this fact in the *prevention* of the most important single complication in such patients, namely: the *development of infection* in the scalp, skull, meninges and the brain.

As recently stressed (1938) in a previous publication from this Clinic[1] and by Coleman,[2] the infrequency of shock as a result of head injury *per se* should be emphasized. If one take a systolic blood pressure reading of 100 mm. Hg. as a fairly accurate criterion of the dividing line between shock and non-shock, in adults, one will find that only a small minority of patients fall into the shock group, i.e., blood pressure below 100 mm. Hg. systolic; unless (1) there has been an overwhelming brain injury with or without a severe basal fracture associated with profound unconsciousness, blood pouring from the cranial orifices, widely dilated and fixed pupils, possibly a massive intraventricular hemorrhage, etc.; (2) great blood loss from scalp lacerations or elsewhere, or (3) severe associated injuries of the chest, spine, pelvis, abdominal viscera or extremities. It is believed that not more than 10 per cent of all head injuries are associated with delayed or secondary shock and the majority of cases of uncomplicated head injury with shock can be relieved by a simple intravenous infusion of 1,000 cc. of normal saline solution in a few moments, or by a blood transfusion, if the infusion does not suffice. As a matter of fact, in an analysis of 194 cases of acute head injury studied several years ago at the Medical College of Virginia it was found that only 8.8 per cent of the patients were in shock on admission, these patients being unselected in regard to the presence or absence of associated injuries; furthermore, only 6.9 per cent of the patients with skull fracture that did not have associated injuries were in shock. In another analysis of a similar group of 388 unselected cases of acute head trauma, it was found that only 7.2 per cent of the patients were in shock on admission to the hospital. Thus it is seen that in these three analyses, the incidence of shock even in unselected series of acute head injury, was well below 10 per cent when the patients were admitted to the hospital.**

There is still too widespread an opinion in the

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**In our most recent (1940) analysis (391 cases) the shock incidence was 6.9 per cent.

profession that a blow on the head sufficient to render a patient unconscious (concussion) must be associated with shock and that therefore nothing had better be done to scalp lacerations and compound depressed fractures of the skull for a day or two until the supposed "shock" has been combated. Nothing could be further from the truth.

As stressed by Coleman[2] and by Crutchfield,[3] the most important single factor in the management of acute head injuries is the prevention of infection and this desideratum depends chiefly on the early debridement and primary suture of all lacerations of the scalp.† If the physician waits one to two days or even longer before carrying out these procedures, a high percentage of scalp infections, osteomyelitis, extra-dural and subdural abscesses, meningitis and brain abscess will result, not to mention the prolonged disability and the postponement of discharge of the patient with the resultant withholding of hospital beds from other patients in this day of crowded hospitals. The prevention of infection, accomplished mainly by the early debridement and primary suture of lacerations and compound depressed skull fractures within four to six hours after the injury, cannot be too strongly emphasized as the most important surgical factor in the successful treatment of head injuries in general.

In addition, if scalp lacerations are not properly treated at the time of the injury and do not heal *per primam*, the risk of operation, if necessary, a few days or more after the injury, for a possible extra-dural or subdural hemorrhage or a simple depressed skull fracture, is always aggravated by the already existing infection which may well, in such a case, be carried into the meninges and the brain itself, in spite of the most meticulous operative technique.

It is important to recognize extra- or subdural clots and other surgical emergencies in cases of acute head injury, but from the standpoint of numbers alone, the *prevention of infection* has always been, and will remain, the great problem in acute head injuries.

In 1931, Coleman[4] stated that the proper treatment of scalp lacerations is too often neglected and troublesome infections are frequently found. In order to emphasize this point, seven illustrative cases have been selected from a considerable number of similar patients seen within the last three years in the Neuro-Surgical Clinics of the University of Virginia and the Medical College of Virginia. They are arranged in the order of the severity of infection, although it must be recognized that, until the disease has been entirely eradicated, any individual infection can spread from the scalp to the underlying structures at any time.

A. SCALP INFECTIONS (1 Case)

Case I.—A white man, aged sixty-two, was admitted to the University of Virginia Hospital March 5, 1939, and discharged May 4, 1939. He had been injured twelve days before admission in an automobile accident, at which time he sustained a concussion of the brain and a long laceration of the scalp over the vertex which had become infected. For several days before admission, the scalp had been draining thick greenish pus very profusely which showed, on culture: a staphylococcus, a strep-

Fig. 1.—*Case I.*—Dakin's tubes (arrows) beneath scalp for continuous irrigation with Dakin's solution, dichloramide-T and 2 per cent acetic acid, during the acute stage of the infection. No evidence of osteomyelitis.

†This is best accomplished by first *shaving the scalp* around the laceration. Tincture of iodine (3.5 per cent) is then applied to the scalp wound, *but not including* the laceration; this latter procedure will avoid all pain. Novocaine solution (1 per cent) is next infiltrated around the laceration through the previously treated skin. Iodine and alcohol are finally applied to the laceration itself and debridement and primary suture of the wound is completed, after *thorough* irrigation with normal saline solution. This will prevent infection in practically every case if done within four to six hours after the injury.

tococcus and a diphtheria-like organism. The patient's general condition was poor. By slight pressure on the scalp, several ounces of thick pus would escape through the laceration. He was quite orthopneic and edema of the ankles was present. Skull X-rays on admission did not show evidence of osteomyelitis or of fracture. Multiple scalp incisions were made under local (novocaine) anesthesia on several occasions, as many as twelve Dakin's tubes being inserted at one time through separate incisions, in a corona-like manner, around the base of the head (Fig. 1).

Fig. 2.—*Case I.*—Granulating area over vertex, two months after pinch grafts (arrows) had been transplanted from the left thigh. Note that the area is almost completely epithelialized.

All the galea sloughed away in long foul-smelling necrotic sheets of tissue. Irrigations were carried out for weeks with Dakin's solution, dichloramine-T and 2 per cent acetic acid (for the diphtheroid infection). Several blood transfusions were given. The patient slowly improved and, when all infection had subsided, the granulating area over the vertex was covered with pinch grafts from the left thigh (4-24-39; Fig. 2). Several X-ray examinations of the skull revealed no definite osteomyelitis at any time. When last seen (December, 1939) the patient was quite well, epithelialization having completely covered the granulating area over the vertex.

COMMENT:

This patient was extremely fortunate in having escaped a severe osteomyelitis of the skull, or even a brain abscess or meningitis. Had osteomyelitis developed, removal of the infected bone under a general anesthetic would have been out of the question because of his precarious cardiovascular system. This case is the most severe scalp infection with which we have had to deal and it was only by the most heroic measures that infection of the skull, the meninges and the brain could be prevented. Had the initial suturing of the scalp healed *per primam*, the patient would have been spared weeks of hospitalization and grave threat to life itself.

B. POST-TRAUMATIC OSTEOMYELITIS OF THE SKULL (3 Cases)

The following three cases of post-traumatic *osteomyelitis* of the skull are presented in series:

Case II.—A white girl, aged five, was first admitted to the University of Virginia Hospital July 8th and discharged July 31, 1938. She had been injured three years before that time when she had sustained a contusion of the occipital scalp followed by a hematoma and subsequent infection. There was no scalp laceration. An operation performed elsewhere one year before admission (two years after injury) revealed osteomyelitis of the skull and there had been drainage ever since that time; at intervals, drainage would cease and then suddenly a stream of pus would appear.

On admission, the child showed no signs of increased intracranial pressure although the infection was located over the cerebellum. Skull plates showed an area of bone defect three centimeters in circumference at the external occipital protuberance with surrounding osteomyelitis.

The first operation at the University of Virginia Hospital was carried out July 12, 1938, under avertin-ether anesthesia. The anesthetic was tolerated poorly, as in all subsequent operations, the patient becoming cyanotic due to irregular breathing in the cerebellar position. The draining sinus of the scalp was widely excised with surrounding bone. The cerebellum was adherent to the overlying dura

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which was not opened. Iodoform gauze drainage was inserted extra-durally and the child made a good primary recovery. The removed bone showed subacute osteomyelitis on histologic examination. She was discharged nineteen days after operation, having received (1) several blood transfusions ad interim, (2) autogenous hemolytic staphylococcus vaccine (recovered from the cultured bone) and, (3) Dakin's solution irrigations, which were continued after discharge of the patient to her home.

Fig. 3.—*Case II.*—Well-healed operative scar, six months after second operation.

The child was readmitted on October 24, 1938, and discharged November 20, 1938. The lesion—still draining pus—was, by this time, quite precarious, i.e., osteomyelitis of the occipital bone (laterally) adjoining the foramen magnum with the scalp quite adherent to the dura so that mere exposure of the involved bone was dangerous due to the occipital venous sinus and also because of the risk of opening the dura with subsequent meningitis. Several lead markers were placed as guides over the site of the infected bone. All additional bone was removed in a two-stage procedure, the occipital venous sinus being opened at one time; the sharp bleeding resulting therefrom was controlled with a muscle implant. The patient recovered satisfactorily from these two procedures and is now well and attending school, with the scalp and skull completely healed, (Fig. 3) removal of all occipital bone overlying the cerebellum (from mastoid to mastoid) having been necessary before cure could be obtained (Fig. 4).

Case III.—A white woman, aged thirty-four, was admitted to the University of Virginia Hospital September 24, 1938, and discharged October 21,

Fig. 4.—*Case II.*—X-ray appearance of occipital bone. three months after second operation. Note large area of bone defect (outlined by arrows and dots) representing the final removal of diseased bone. The inferior portion of the defect represents bone removed at second operation. No evidence of osteomyelitis.

1938. She had been injured two months before admission in a family altercation, at which time she was struck in the left side of the head with a pick-axe. On admission, the scalp was unshaved and the left side of the skull was found to be elevated several centimeters from the dura as far inward as the longitudinal sinus; apparently the axe had pried the skull upward (Fig. 5). On irrigation of the extra-dural space with saline solution, there was an immediate flow of fluid through the nose and mouth which almost

strangulated the patient; apparently the frontal and (or) ethmoid sinuses had been widely opened by the injury. X-rays of the skull disclosed a long bursting fracture involving most of the right fronto-parietal suture. It extended to the top of the right frontal

Fig. 5.—*Case III.*—Condition on admission. Note quite distinct elevation of skull from surrounding structures (arrows). Irrigation of extra-dural space beneath bone ledge produced an immediate flow of fluid from the nose and mouth; free communication with the paranasal sinuses was demonstrated at operation. Beneath the elevated bone a dural laceration at least two cm. in length was found, caused by the pick-axe.

sinus whence it proceeded obliquely across the forehead, unroofing the right frontal sinus. The major portion of the frontal bone was thus almost entirely separated from the rest of the skull and was lifted upwards about one centimeter (Fig. 6). The mesial portion of the left frontal bone was almost entirely destroyed by bone infection. Culture of material from the extra-dural space yielded a hemolytic staphylococcus aureus and a B. xerosis, from which a vaccine was made and administered to the patient. Her general condition was good. The temperature and white blood count were normal. There was no headache or stupor and neurologic examination was negative.

The patient was first operated upon (avertin-ether) September 27, 1938, at which time a wide excision of the left side of the skull was carried out. A compound *depressed* fracture was found in addition to the elevation and a large sequestrum, 10 x 10 cm., was lifted out intact. Bone was widely removed (12 x 14 cm.) over the left fronto-parieto-temporal region, both frontal sinuses being completely exenterated. An old dural laceration was found two centimeters in length in the left posterior frontal region with cerebral cortex adherent to it. A portion of fascia from the clean temporal muscle was used to cover the defect. The superior longitudinal sinus was widely exposed. Closure was made very loosely with silkworm gut sutures and Dakin's solution irrigations were carried out for sixteen days, at which time (October 13, 1938) a secondary closure was made together with removal of additional bone in the right frontal region. The frontal sinuses were aspirated of all muco-pus and closure was accomplished with iodoform gauze drainage and three Dakin's tubes placed extra-durally.

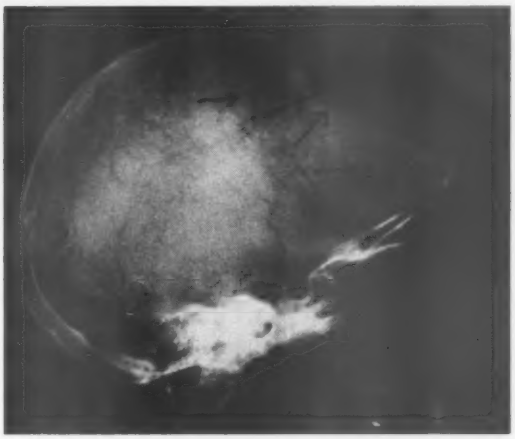

Fig. 6.—*Case III.*—X-ray appearance of skull on admission (left lateral view). Note elevation of entire frontal bone with osteomyelitis (double arrows) and radiating linear fracture lines (single arrows).

The patient was discharged to her home eight days after the last procedure, having received several blood transfusions in the interim; X-rays of the skull before discharge showed that all the infected bone had been removed. (This has been confirmed by subsequent X-rays—last one: August 6, 1939). Dakin's solution irrigations were carried out through the tubes for three months by her home physician; the tubes were then removed. There is now no sign of infection except for a tiny draining sinus just above the glabella which is very probably due to an upward

discharge from the widely-opened frontal or ethmoid sinuses, for the skull is free of infection on X-ray examination*.

Case IV.—A colored boy, aged ten, was admitted to the University of Virginia Hospital December 1, 1938, and discharged December 15, 1938. He had been accidentally bitten in the scalp over the vertex by a playmate five weeks before admission while engaged in a wrestling match. It was stated that the scalp had drained pus ever since, several incisions having been made elsewhere in the interim through the scalp only, to facilitate drainage.

The child's condition was good. The temperature, pulse and respiration were normal as was the white blood count. The fundi and neurologic examination generally, were normal. X-ray examination of the skull showed extensive osteomyelitis over the vault of the cranium. Examination of the pus, which drained profusely from several lacerations of the scalp, disclosed a hemolytic staphylococcus albus, a non-hemolytic streptococcus and B. coli.

Fig. 7.—*Case IV.*—X-ray view of skull at time of hospital discharge showing large area of skull sacrificed in a one-stage procedure (arrows and dots). Note clean bone edges of defect with no evidence of osteomyelitis (eight days after operation). Bone defect later covered with celluloid plate (see text).

The patient was operated upon (avertin-ether) four days after admission (December 5, 1938) and extensive removal of bone in the vertex of the skull and sequestrectomy were carried out. The dura, fortunately, was intact throughout and there was no cerebrospinal fluid leak at any time. An area of dura 10 x 12 centimeters in diameter was exposed, with the superior longitudinal sinus running vertically through the center. The dura pulsated normally and the brain appeared to be under normal tension. Closure was made with catgut in the galea and interrupted silk sutures in the skin; two iodoform gauze drains and three Dakin's tubes were placed down to the extra-dural space. The child tolerated this extensive one-stage procedure rather well; he was returned to the ward in good condition after having received a blood transfusion in the operating room at the close of the operation. X-ray examination of the skull before discharge showed it to be free of infection (Fig. 7). He was sent home with the Dakin's tubes still *in situ* and irrigations were carried out by his home physician. All tubes were removed by February, 1939, since which time there has been no drainage and X-ray examination (April 4, 1939) shows new bone formation with no discernible infection of the skull.†

COMMENT: (on Cases II, III, IV—Osteomyelitis of the Skull).

The first patient in this series of three post-traumatic osteomyelitis cases (Case II) illustrates the importance of evacuating hematomas of the scalp promptly. Such hematomas should be aspirated within twelve to twenty-four hours of their formation and a tight elastic pressure bandage applied; if this does not suffice to eliminate the hematoma, incision and drainage of the scalp for twenty-four to forty-eight hours is absolutely necessary or infection is very liable to ensue, precisely as a collection of blood in the pleural or peritoneal cavities is prone to infection. The tight adherence of the scalp to the denuded dura overlying the cerebellum (Case II) made it peculiarly difficult to eradicate the osteomyelitis without (1) entering the occipital venous sinus with serious if not fatal hemorrhage and also without (2) inadvertently opening the dura and producing an overwhelming meningitis.

*In November, 1939, a radical left ethmoid exenteration was carried out by the otolaryngology department, followed, in a few days, by closure of the draining sinus in the mid-frontal region by the neuro-surgical department. The patient is now free of all draining sinuses and infection and awaits a celluloid plate insertion about August, 1940.

†In November, 1939, a large celluloid plate was inserted to cover the huge cranial defect in the vertex of the skull. This had to be removed four months later due to a recurrence of drainage although there was no evidence of osteomyelitis. It is planned to wait at least *twelve months* before re-inserting the plate.

It is also most fortunate that, during one of the pre-admission periods when drainage periodically ceased (pus being pent-up beneath the scalp and skull) that the infection did not spontaneously erode through the dura with subsequent meningitis. Truly, the dura mater is a firm and powerful barrier to infection.

The second patient in this series (Case III) was also extremely fortunate not to have developed a brain abscess and (or) subdural infection and meningitis as the dura had been widely opened by the blow from the pick-axe. The extensive opening of the frontal sinuses made this even more likely as there was a free entry to infection, the left side of the skull having been literally lifted one centimeter or more above the overlying dura, which was lacerated. It is because of such a possibility (i.e., dural laceration) that immediate operation within two or three hours, if possible, of all compound depressed fractures of the skull with complete closure of the dura and scalp is urgently necessary. Coleman[5] has said that practically all the cases of meningitis that have resulted from head trauma (apart from concomitant cerebritis due to improperly managed compound depressed fractures) in his experience, have followed those injuries in which the fracture line passed into one of the accessory (paranasal) sinuses, mastoid or middle ear.

The third patient in this series of osteomyelitis cases (Case IV) demonstrates the extreme virulence of the human or animal bite. All surgeons are familiar with such lesions in the arm and hand; a particularly vicious infection occasionally ensues, in spite of all treatment, requiring loss of the affected extremity by amputation. The oral cavity harbors an innumerable number of pathogenic bacteria and any patient seen with a history of having been bitten (by a human or by a lower animal) should have an immediate and most thorough debridement carried out. As a result of the infection which rapidly developed in this case (Case IV), it was necessary to sacrifice almost the whole of the vertex of the patient's skull, exposing him, before this was done, to the very possible development of a brain abscess or meningitis if the infection had penetrated the dura.

C. POST-TRAUMATIC BRAIN ABSCESS (2 Cases)

The following two cases of post-traumatic brain abscess are also presented in sequence:

CASE V*.—A white woman, aged thirty-seven, was first admitted to the Memorial Hospital, Richmond, on January 6, 1936, and discharged March 22, 1936. She had been injured three weeks before admission in an automobile accident, having been thrown out of the car; she was, however, only momentarily unconscious. She sustained a two-inch scalp laceration in the left frontal region but skull plates (taken on admission to the Memorial Hospital, Richmond) revealed no fracture or osteomyelitis. At the time of the injury, the undebrided scalp had been approximated with skin clips. Three days after the injury, infection developed in the scalp wound with considerable sloughing of subcutaneous tissue. Twenty days after the injury, the patient had a *convulsion* characterized by clonic movements of the right arm and unconsciousness. When she awoke, aphasia was noted, the patient being right-handed, and she complained of considerable headache.

On examination at the time of admission, the patient was fairly alert and cooperative. Three infected draining sinuses of the scalp in the left frontotemporal region were seen from which pus was exuding. A culture of the scalp wound showed the presence of hemolytic streptococci. The temperature was 100.3° and there were 11,200 white blood cells/cu.mm.

For the first ten days after admission, the patient improved under observation. The temperature approached normal and the draining scalp appeared to be healing under continuous warm saline compresses. Two days later (January 18, 1936), the patient became quite apathetic and her speech was confined to monosyllables: definite aphasia was present. Severe headache occurred and on January 21, 1936, the left frontal region was explored (Dr. Coleman) under novocaine anesthesia. The bone was softer than normal and the dura was tense. A ventricular needle introduced into the subdural space encountered purulent fluid; ten cc. were removed by gentle aspiration. A loose closure of the wound was made. Two days later, again under novocaine anesthesia, an abscess in the left frontal lobe was drained; one ounce of purulent fluid was obtained. The wound was packed with gauze without a drainage tube, the scalp being left open (Fig. 8). On January 29, 1936, eight days after the original operation, the left frontal abscess was tapped

*The writer is greatly indebted to Dr. C. C. Coleman for permission to report this case from his Clinic at the Medical College of Virginia, Richmond, seen during the writer's term of service as Resident Neuro-Surgeon.

in the patient's room with a ventricular needle; only old tarry blood could be obtained. The patient again became quite drowsy and on January 31, 1936, she could not be aroused. Under avertin anesthesia, a number eighteen French catheter was placed in the abscess cavity the same day, the catheter being sutured to the galea of the scalp. The tube drained pus actively for the next four weeks and her condition improved, although culture of the subdural and intra-cerebral abscesses also yielded hemolytic streptococci.

Fig. 8.—*Case V.*—Condition of wound five days after the first drainage of abscess of left frontal lobe by tapping with a ventricular needle (five weeks after the original injury). The brain fungus is seen (arrows) protruding slightly through the opened dura. A French catheter drain (No. 18) was introduced into the abscess through the fungus three days later. (From "Operative Surgery" by Horsley and Bigger, vol. II, p. 1173, 4th ed., 1937, The C. V. Mosby Co., St. Louis; by kind permission of the authors and publishers.)

The aphasia subsided considerably; however, the disks showed three to four diopters of choking for several weeks before discharge from the hospital. On March 2, 1936, about one month after its insertion, the tube was removed and the fungus cerebri receded to only a few millimeters' elevation above the surrounding scalp. At the time of discharge, two and one-half months after admission, she was greatly improved. Her temperature had been normal for two weeks and considerable hope was felt for her complete recovery with possibly slight residual aphasia.

However, eleven days after discharge from the hospital, she was readmitted (April 2, 1936) and discharged May 3, 1936. She was again quite ill with marked aphasia and stupor. On the day of admission, the fungus was tapped in the patient's room and one and one-half ounces of greenish-yellow pus were obtained containing hemolytic streptococci. A ventricular needle or catheter could not be placed satisfactorily into the abscess for continuous drainage due to the high intracerebral pressure. Two days later, no pus at all could be obtained although the patient was very drowsy. It was thought that she had multiple small abscesses with septic cerebritis of the left cerebral hemisphere. Eleven days after admission, a soft rubber catheter was placed in the abscess and thick yellow pus drained profusely through it. At this time, the optic disks showed two diopters' elevation. The patient improved thereafter and she was discharged twenty days after the insertion of the tube (which was left *in situ*), her temperature having been normal for several days before leaving the hospital.

She was admitted for the third time on June 4, 1936 (one month after the second hospital discharge) and died* July 21, 1936. One week after the second hospital discharge she had again become very aphasic and severe headache supervened. The cerebral fungus at the time of the third admission was under great tension. No pus could be obtained when a ventricular needle was introduced into the fungus on several occasions. She became more stuporous, had right-sided convulsions and three to four diopters of choking of the disks was present. She died approximately seven months after the head injury. No autopsy could be obtained.

Case VI.—A white boy, aged nineteen, was admitted to the University of Virginia Hospital on July 12, 1938, and discharged August 20, 1938. He had been injured three days before admission when he was struck in the left frontal region with a sickle during a family altercation, the scalp laceration being located four centimeters above the left eyebrow. There was no definite history of unconsciousness at the time of the injury. When seen by his physician several hours later, no mention was made to him (the physician) of the sickle incident, which had required the combined traction of both hands to dislodge it from the skull immediately after the injury. A dressing was placed over the laceration and the patient returned to his home. Seventy-two hours later (three days after the injury) he first appeared at the University of Virginia Hospital, seriously ill. The temperature was 102.6°, the neck was quite spastic and a definite cellulitis was present in and around the scalp wound. The patient was

***This case occurred before the introduction of sulfanilamide which, together with surgical drainage, might well have resulted in cure of the patient, as the sole organism found was a hemolytic streptococcus.**

drowsy but conscious, complaining of severe headache. No convulsions had occurred. The pulse rate was 56/M on the night of admission. X-ray examination of the skull revealed a comminuted depressed fracture beneath the laceration (Fig. 9) although no aerocele was seen; furthermore, on separating the edges of the incision, cerebrospinal fluid escaped and meningitis appeared definite. No lumbar puncture was done for fear of carrying infection inward from the infected wound. Immediate operation was out of the question because of the already present

Fig. 9.—*Case VI.*—X-ray view of frontal bone on admission, three days after the injury induced by a sickle. Note the comminuted depressed fracture (arrows) of the left frontal bone. The patient, at this time, had meningitis and a marked cellulitis of the scalp surrounding the fracture.

widespread infection. Accordingly, for the next twenty-three days, hot boric acid dressings were applied over the laceration and sulfanilamide, (grains forty to sixty per day) was administerd, the culture of the laceration having shown a non-hemolytic streptococcus and a hemolytic staphylococcus albus†. Fifteen hundred units of tetanus antitoxin were also administered on admission. Six days after admission (July 18, 1938), the patient was much improved and was quite rational and alert. The problem became one of waiting for the infection to localize sufficiently to permit of successful operation on the depressed fracture and also to enable a probable left frontal lobe abscess to encapsulate. On August 4, 1938, twenty-six days after the injury, the depressed bone fragments were removed (avertin-ether anesthesia); the dura had also been lacerated for a distance of three centimeters by the sickle. As the depressed fragments were carefully lifted out from the frontal lobe, a sudden flow of greenish-white pus occurred, fully three ounces in amount. No definite capsule of the abscess could be demonstrated. No cerebrospinal fluid leak occurred, the lateral ventricle was not opened, and the cerebral cortex was rapidly coagulated to the periphery of the dura by the electrosurgical current. A gutta-percha drain was placed into the abscess cavity which tended to fill in rapidly. The culture of the pus from the abscess showed a staphylococcus (hemolytic) albus and S. aureus. Sulfanilamide was continued for a few days after operation and the gutta-percha drain was removed sixteen days after operation. He made an uneventful recovery and is now well, fourteen months after evacuation of the abscess and fifteen months after the injury which caused it.

†There is evidence to show that sulfanilamide is also effective against the hemolytic staphylococcus if it is given before too much tissue destruction has occurred; sulfapyridine is also of value in staphylococcic infections.

COMMENT (on Cases V and VI).

The first patient (Case V) in this series of post-traumatic brain abscesses shows quite clearly the possibility of a brain abscess developing from an ordinary scalp laceration with no fracture of the skull whatever; the infection travels inward through the cranial diploe, to the extra- and subdural spaces and finally, subcortically, into the brain itself. Had sulfanilamide been available at that time, recovery might well have ensued, although the infection was a most virulent one when first seen, proceeding, in spite of all possible drainage, to the type of brain infection that is almost always, if not invariably, fatal: multiple small brain abscesses with surrounding septic cerebritis.

The second patient (Case VI) demonstrates the wisdom of excising all scalp lacerations *immediately* down to the skull; this would have disclosed the underlying fracture and led to early operation, although the patient was at fault in not disclosing the full facts of the injury to his physician when he first presented himself for treatment on the day he was injured. When first seen at the University of

Virginia Hospital, three days after the injury, operation was contraindicated due to the widespread infection with undoubted meningitis and a probable unencapsulated brain abscess. It was only after treatment with sulfanilamide and the application of hot boric dressings to the scalp for two and one-half weeks that operation, with drainage of the left frontal lobe abscess, could be done. Even with this treatment, the patient quite possibly would have succumbed from meningitis and a brain infection, had it not been for the supportive sulfanilamide therapy.

D. OVERWHELMING POST-TRAUMATIC INFECTION OF THE BRAIN (1 Case)

The final case demonstrates one of the most severe (often fatal) types of skull and brain injury, i.e., that which involves the paranasal sinuses with subsequent meningitis:

Fig. 10.—*Case VII.*—Detailed view of frontal region of skull on admission. Note marked involvement of both frontal sinuses and ethmoid region by the fractures. The overwhelming infection in this case originated in the widely opened paranasal sinuses which undoubtedly communicated with the subarachnoid spaces at the base of the brain.

Case VII.—A colored man, aged thirty, was admitted to the University of Virginia Hosptal on August 25, 1939, very seriously ill, and died the next day. He had been injured seven weeks before admission in a combined train-automobile accident, having sustained bursting, stellate fractures of the skull, the frontal sinuses and the ethmoid sinuses. A fracture of the right femur and pelvis also had occurred, requiring a cast. For three weeks before admission he had become progressively more drowsy and semiconscious with increasing fever, frequent chills, vomiting and severe headache.

On admission, the patient was very drowsy and disoriented. There was an actively draining sinus over the right frontal region and a healed scar was also seen overlying the right frontal bone. The neck was very spastic. X-ray examination of the skull disclosed numerous bilateral fractures throughout the frontal bones including the right orbit, frontal and ethmoid sinuses (Fig. 10). The nasal bones were badly shattered. The morning after admission the patient had a convulsion involving chiefly the right side of the body; the temperature rose to 105°. He was transported to the operating room and, without any anesthetic whatsoever, the left frontal lobe was tapped with a ventricular needle in several directions. No pus was obtained on gentle aspiration with a syringe. A collection of purulent fluid was found which extended widely beneath the dura over the left cerebrum (i.e., a subdural abscess). The left lateral ventricle was tapped and definitely purulent fluid was recovered under greatly increased pressure. Culture of this fluid for forty-eight hours in the laboratory was sterile*. The prognosis was a fatal one in view of the widespread subdural and intra-ventricular infection and the patient died the night after operation. No autopsy could be obtained.

COMMENT: (Case VII).

There is now a routine order in our Clinic that sulfanilamide is to be given to every patient admitted with a head injury associated with a cerebrospinal fluid leak through the nose or ear. It is difficult to see how such an overwhelming infection (Case VII) could have been prevented at any time as the patient had no definite depressed fracture and there was, therefore, no indication for immediate operation, unless a cerebrospinal fluid leak with an intracranial aerocele had been present at the time of the injury. There was no evidence of these latter complications on admission to the University of Virginia Hospital, seven weeks after the injury. Most patients with linear fractures involving the paranasal sinuses and mastoids, with or without cerebrospinal fluid leaks, recover under conservative treatment only, the drain-

***Quite occasionally, a *seventy-two-hour culture* yields organisms not recoverable during the first twenty-four to forty-eight hours.**

age of fluid through the cranial orifices usually ceasing spontaneously in a few days. Cerebrospinal fluid leaks from the ear are, as a rule, less dangerous than those from the nose; the latter are occasionally associated with an intracranial aerocele which combination frequently requires early operation with closure of the fistula between the subarachnoid space and the ethmoid and (or) frontal sinuses. It is interesting to compare this case (Case VII) with Case III in which latter patient widespread opening of both frontal sinuses had occurred with a rather large dural tear as well and yet only a *bony* infection resulted (osteomyelitis). Once a suppurative ependymitis (ventriculitis), with or without a subdural abscess has developed, a fatal outcome is the rule.

SUMMARY AND CONCLUSIONS:

1. The seven cases of post-traumatic infection presented in this paper graphically demonstrate the possible disastrous effects of infection of the scalp, skull, meninges and underlying nervous structures.

2. Because of the low incidence of shock in cases of acute head injury (less than 10 per cent) and hence the *inadvisability of delay* in repairing scalp lacerations and compound depressed fractures of the skull beyond four to six hours after the injury*, most of the instances of post-traumatic infection are *preventable*.

3. Shock occurs infrequently in cases of acute head injury unless there has been (1) severe blood loss from scalp lacerations or elsewhere; (2) severe "associated" injuries of the chest, spine, extremities, abdomen, etc.; (3) an overwhelming brain injury. Even the majority of patients in shock on admission can be relieved of it in a few hours by the usual measures, which will at least permit of prompt and proper repair of lacerations of the scalp and compound depressed skull fractures by adequate debridement and primary suture without drainage.

4. *The most important single factor in the successful management of acute head injuries is the prevention of infection.* The occasional extra- and subdural hemorrhage must be recognized and evacuated immediately but, from the standpoint of numbers alone, the *prevention of infection* (by *prompt* and *proper* repair of lacerations and other open wounds of the head) far outweighs the former in importance. Unless the profession fully realize the *low incidence* of shock in acute head trauma, prompt treatment of scalp lacerations and other open wounds of the head—i.e., within a very few hours of the injury—will be delayed, with a resultant high percentage of *preventable* instances of scalp infections, osteomyelitis, meningitis, extra-dural, subdural and brain abscesses, pyogenic cerebritis, and purulent ependymitis.

*Horrax[6] advocates primary closure without drainage of all open wounds of the head, if operated upon *within twelve hours after injury.*

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DISCUSSION.

DR. C. C. COLEMAN, Richmond: Dr. Meredith has made a very timely argument in his paper for careful study of head injury patients in the early hours after injury. He has emphasized in some detail the need for a more careful interpretation of the patient's general condition with reference to the presence or absence of shock. There are two errors seen in the attitude of surgeons toward shock. In the first place, it may be assumed that shock is present when it is not, or it may be thought that shock continues after it has disappeared. These errors may lead, as Dr. Meredith has stated so well, to the postponement of procedures designed to prevent infection and serious complications in open wounds of the head.

Surgery for cranial trauma has three main objectives: first, prevention of infection; second, removal of a localized intracranial hematoma; and, third, elevation of depressed fractures. Probably in less than 1 per cent of cases is operation needed for edema of the brain unless it is accompanied by intracranial hemorrhage. Therefore, if one erroneously assumes that the patient with an open wound of the head, such as a contused laceration or compound fracture, is in shock, and delays the necessary operative procedure for the prevention of infection, a contribution is made to a higher mortality when mortality in such cases might be avoided. On the other hand, we should consider, as very important, the danger of subjecting the patient who is in shock to any operative procedure not necessary to control obvious

hemorrhage. In the stage of shock all treatment should be directed to the alleviation of this condition. Not only are operative procedures, such as suture of lacerations or attempts to elevate a depressed fracture, harmful to the patient when he is in shock, but exhaustive examinations and particularly X-ray studies should be delayed until the patient has recovered from shock.

For many years we have used blood pressure estimation to determine presence of shock, and when the patient is in shock the examination consists only of a rapid survey of the patient as a whole without disturbing him. The condition of the pupils with reference to response to light and inequality should be noted. Obvious hemorrhage should be stopped by simple methods. Gross injuries to the chest and long bones can be detected with little disturbance of the patient.

I should like to emphasize what Dr. Meredith has stated—that shock is not necessarily a complement of head injury. In a series of 1,078 consecutive cases analyzed for the meeting of the Southern Surgical Association in 1937, we found that shock was present in only 6 to 7 per cent of the entire series and when shock was present it nearly always was due to severe associated injuries of the chest, long bones, or injury to the abdominal viscera. If shock is present in the average case of head trauma, the surgeon would do well to search for associated injuries.

While head injuries may be associated with injuries in many other parts of the body, we have learned from experience over many years to suspect certain combinations of injuries. If the patient has a head injury with an associated injury of the upper arm, shoulder or shoulder girdle, an injury to the cervical spine always should be suspected, due to the convergence of the forces toward the cervical spine. This combination of injuries of the head, shoulder and cervical spine has frequently been seen in the clinics of the Medical College of Virginia and the University of Virginia. Dr. Meredith has discussed the frequency of this combination of injuries in a recent paper.

Inasmuch as surgery of cranial trauma is done in the large majority of cases for the prevention of infection, it is highly important that such operation be done before the contaminated wound becomes actively infected. In order to select the appropriate time for operation one must be alert as to the patient's general condition, with particular reference to the state of shock.

DR. M. H. TODD, Norfolk: I am more interested in the healing of wounds than anything else and I should like to ask Dr. Coleman if he would tell us what to do when the patient is in shock and for that reason these open wounds or lacerations of the scalp have to be left alone. Is it the correct procedure to put on a mild antiseptic dressing and wait for the next day? He has called attention to cases where an immediate operation cannot be done. What is the correct procedure: local mild antiseptic dressings?

DR. COLEMAN: If the patient is in shock, we put on a dressing usually, probably boric acid, and in our disinfecting of these wounds we use large quantities of any simple solution, such as salt solution or boric acid solution, but we never attempt to disinfect with any of the strong chemical disinfectants.

DR. R. L. RAIFORD, Franklin: Several years ago, it was my good fortune to attend a lecture at the Medical College of Virginia, which drove home to my mind the importance of doing a thorough debridement and cleaning of wounds of the scalp with normal saline solution. Since we have adopted this method we have never had a serious infection. I feel indebted to Dr. Coleman and his associates for this one very simple idea, and wish every general practitioner who comes in contact with such wounds could also have this thought driven home. It is so simple and saves so many future complications from infection. Strong antiseptics are not used in such wounds, since experience has taught us that, though they may kill bacteria, they also devitalize tissue and retard rather than augment the healing process.

DR. MEREDITH, closing the discussion: I want to thank the discussers for their helpful comments.

We usually regard three conditions as being capable of producing shock in certain patients with acute head injury and in them, therefore, *immediate* debridement and repair of scalp lacerations and compound depressed fractures cannot be carried out: (1) severe blood loss, from the scalp or elsewhere; (2) severe associated injuries of the chest, spine, abdomen, extremities, etc., as emphasized by Dr. Coleman; (3) overwhelming brain injury, the patient usually being profoundly unconscious, with widely, dilated fixed pupils, possibly bleeding from the cranial orifices, etc. It requires a nice judgment in these cases to determine when the optimum time for repair of open wounds of the head has arrived, in any individual patient.

However, in several analyses made in our Clinics in the last few years relating to acute head injury, it was found that, whether the patients had a fracture of the skull or not, whether associated injuries were present or not—in a word, in any large series of *unselected* head injuries—the incidence of shock on admission to the hospital was always well below ten per cent; usually it was about six or seven per cent. The practical importance of this fact in permitting the *early* repair of open wounds of the head, with concomitant prevention of such infections as described in this paper, cannot be over-estimated.

Two final points concerning concussion of the brain: (1) Any patient with a definite history of unconsciousness should be required to remain in the hospital over-night; this is an invariable rule with us; (2) X-rays of the skull are always (without exception) taken on all patients who have been rendered unconscious, not necessarily at the time of admission, but always before leaving the hospital.

XUM

THE RHEUMATIC PROBLEM.*

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In recent years there has been a growing recognition of and concern with the rheumatic problem. This problem has been created by a wide variety of conditions with common symptoms of pain somewhere about the joints, meaning mainly atrophic arthritis, hypertrophic arthritis, fibrositis, trauma, gout, infectious arthritis and rheumatic fever. It is that field of conditions known generally by laymen in America as "rheumatism".

Convincing proof that "rheumatism" really deserves attention as a medical and economic problem can be found in the many publications of clinical contributions and experimental investigations covered in the five reviews published by the American Committee for Control of Rheumatism.[1, 2, 3, 4, 5] These reviews are annual correlated synopses of the significant literature published in English on "rheumatic diseases". From them the following pertinent data have been selected.

A disease becomes a social problem when the person affected is either a danger or a burden to his fellow citizens. Disease becomes an industrial problem when it leads to disorganization of industry by causing frequent or prolonged absences of employees from their work. In communities where surveys have been made "rheumatism" was one of the outstanding causes of disability. It is the morbidity rather than its mortality that is productive of such an enormous economic loss the degree of which has until recently not been appreciated.

The Metropolitan Life Insurance Company's figures, quoted in 1935, covering sickness prevailing at a given time showed that 164.4 persons per 100,000 were reported as suffering from "rheumatism". This disease group accounted for nearly 9 per cent of all cases of illness.

The same review reported a study conducted at Hagerstown, Maryland, by the United States Public Health Service which included all illnesses over a long period of time showing the annual rate of sickness caused by articular rheumatism and gout were 16.6 per 1,000. In addition such illnesses as muscular rheumatism, lumbago and associated conditions numbered 3 per 1,000. Here again "rheumatism" in general caused more illness than any other disease of long duration, totaling 19.6 per 1,000, compared with heart disease 10.1, arteriosclerosis 1.2, cerebral hemorrhage 0.7, paralysis 1.5, cancer 1.3, and diabetes 0.9. An estimation in the 1935 review is that in the United States in 1932 chronic rheumatic diseases caused a loss of 7,500,000 weeks of work annually and more than $200,000,000.

"Rheumatism" apparently knows no boundaries of climate or geography and few indeed are the countries not widely affected thereby. In a Massachusetts survey, "rheumatism" was more prevalent in rural than the urban communities. Among persons whose economic status was poor, the incidence was nearly twice as high as among the well-to-do. This survey further showed that about four-fifths of the poor and one-half of the well-to-do people suffering with "rheumatism" were not under the care of physicians.

From publications in England information was gathered that occupational factors play a definite role in the incidence of rheumatic disease. It was noted that coal miners and others who worked underground at warm temperatures and high humidities are 50 per cent less subject to atrophic and hypertrophic arthritis than the general male population of Buxton, England, but are 50 per cent more prone to fibrositis. Stokers and others engaged in "hot occupations" seem less susceptible to atrophic or hypertrophic arthritis, rheumatic fever, or fibrositis, but seem prone to gout. Outdoor workers suffered oftener from atrophic arthritis and from rheumatic fever; indoor workers from hypertrophic arthritis and some fibrositis.

Of all patients admitted in 1933 to accredited hospitals in the United States, 97,984, or 1.39 per cent, were admitted because of "arthritis or rheumatic disease". Another survey calculated the incidence of "chronic arthritis and rheumatic diseases" as 22.18 per 1,000 persons or 2.2 per cent of the

*Read before the Seaboard Medical Association of Virginia and North Carolina at Virginia Beach, Va., December 13, 1939.

It was emphasized in discussion, for which the author wishes to express appreciation, that "rheumatism" is the broad general term for use by laymen; while professionally the term "rheumatism" has no meaning because each case must be diagnosed as specifically as possible as atrophic arthritis, hypertrophic arthritis, fibrositis, etc.

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population of which more than 1 per cent had "disabling" rheumatism and 0.85 per cent were "bedridden". Based on these figures it was calculated that about 2,700,000 of the 120,000,000 population are affected with chronic rheumatic diseases, of whom 1,230,000 are "disabled" and 1,020,000 have been bedridden at some time or other.

The results of a house to house canvas by the United States Public Health Service in 1935-36 of 800,000 families comprising 2,800,000 persons in eighty-three cities and twenty-three rural areas in nineteen states indicates that among the chronic diseases of the United States "rheumatism" ranks first in prevalence, second in producing disability, second in producing permanent disability and fourteenth in causing death. It further establishes that there are almost twice as many cases of "rheumatism" as its nearest rival, heart disease, more than seven times as many of "rheumatism" as "cancer and other tumors", ten times as much "rheumatism" as tuberculosis in all its forms, and more than ten times as much "rheumatism" as diabetes.

"Rheumatism" was responsible for more days lost from work, 97,200,000, than any other chronic disability except "nervous and mental diseases". Days of work lost from heart disease were 95,200,000. "Rheumatism" produced more than twice as much disability as tuberculosis. It made more invalids than any other chronic disease except mental and nervous diseases. "Rheumatism" produced more invalids than did heart disease and twice as many as all types of tuberculosis.

In this national survey "rheumatism" included arthritis, gout, neuralgia, neuritis, lumbago and others. The significance of these figures is not minimized by suggesting that perhaps most of the cases were hypertrophic-osteo-arthritis in the elderly, because about 50 per cent of the surveyed group were under forty-five years, and 70 per cent were under fifty-five years of age. The report concluded with an estimation that annually about 1,500,000 persons in the United States are disabled by "arthritis" and in addition 1,750,000 persons are annually disabled by neuralgia, neuritis, and lumbago. In addition to being the "King of Misery" these statistics establish "rheumatism" as a major social and industrial problem.

Slowly but inevitably we in America are developing a more social point of view from which we are beginning to regard more and more problems. When it is only a case of my joints aching and my doctor who does or doesn't give me relief it is a small personal problem. But when one considers all the time and money lost through "rheumatism" and the bad effect on industry and national prosperity it broadens out into an acute national problem. We are all, especially physicians, prone to pessimism when discussing possible solutions. We are too exacting and delay action in seeking the perfect solution. Unfortunately one problem leads to another, but it is a mistake to become so immersed in the problems that we don't take active steps to remedy the existing defect. In other words, this problem should be turned into a project and the physicians are the best group to undertake it. This will entail a lot of hard work, cooperation and some financial outlay but it will strengthen the position of physicians as leaders in national welfare and will help educate the public to have a higher regard for expert medical attention. The widespread existence of "rheumatism" and its disastrous results should be made familiar to everyone so that a wholesale desire will be created for early diagnosis and skilled treatment. When these two basic measures, early diagnosis and skilled treatment, have been established and carried on for some time, we will be better able to judge how much permanent disability can be prevented. In addition to the problem of education, physicians as well as everyone else will have to face at the beginning of the planning the question of those financially as well as physically disabled.

One of the first steps necessary to successfully handling the rheumatic problem and especially that of early diagnosis is the adoption and use of standard classifications. These standard terms should be used nationally and, if possible, internationally, to ensure mutual understanding. "Rheumatism" in its broad sense is a splendid disease picture which the patient can be taught to recognize in its early stages from its symptoms and to seek early medical advice. But before beginning treatment the physician must classify as correctly as possible the specific disease affecting the patient because the procedures to be followed in gout, hypertrophic arthritis, atrophic arthritis, or the other forms differ.

In order to diagnose and classify the rheumatic case and instigate proper treatment without delay the physician frequently needs a greater latitude than is available. A basic history and a thorough physical examination with the individuality of the patient

and his peculiar problems taken into consideration are essential. But the physician must have available certain laboratory facilities which include the usual basic blood and urine studies and when indicated for the rheumatic case blood uric acid studies, blood cultures, sedimentation rate and finger nail studies for cystine content. In addition the case may require well taken and correctly interpreted X-ray studies, a basal metabolic rate or other procedures. At this point the perplexing questions begin to arise. These facilities which are agreed upon as necessary involve a great amount of expense to the physician and to the patient. There is a large group of patients that if educated to see the wisdom of the necessary diagnostic process can afford the necessary investigations. But the incidence of "rheumatism" was found to be nearly twice as high among the poor as among the well-to-do. How can we arrange that those who are unable to pay the increased costs or those who cannot meet any costs shall have available all necessary facilities for early and correct diagnosis? It is especially this group of patients who make "rheumatism" a national social and industrial problem.

It is neither reasonable nor just to demand that all physicians install all of the equipment listed above unless they can expect a fair return on the investment. This problem can be met by overcharging those who can afford to pay until their fees cover the shortage caused by those unable to pay. Another possibility is to equip a few physicians to handle large numbers of patients with some plan of subsidy which would cover those cases which can only pay partial fees or no fees at all. One means of securing financial aid is by private contributions through the formation of non-profit rheumatic associations which would collect money through drives and use this money to defray the costs of those patients unable to pay. Another possibility is to have these expenses subsidized by the county, the state or the national government or a combination of the three.

Closely allied with the problems of diagnosis are those of treatment. Rheumatic treatment is a wide field and the investigation of it is incomplete but many feel that in actual practice treatment probably lags behind present-day knowledge. It is difficult to judge the value of a new form of treatment and to give it its due place in the practical management of rheumatism. Sometimes new ideas are adopted merely because they are different. On the other hand, some ineffective measures remain in practice solely because they have become a part of routine. There are some fundamental principles that are omitted because their application is not practical at present.

Rest is a fundamental principle that is still universally recognized as having the utmost value. This means complete physical relaxation and dis-association from worry. But there are very few times when this primary necessity can be accomplished at home under favorable conditions and it is absolutely impossible under adverse home conditions. General nutritional measures are often equally difficult to obtain.

Here again the paramount factor is the expense involved. At present most institutions are so pressed that they can only take care of emergencies without funds and cannot undertake to provide for long chronic illnesses. As has been said before, many rheumatic patients can pay for minor illnesses but cannot afford indefinite hospitalization. Rheumatic treatment consists of many measures equally necessary as rest, medication, different types of intravenous, subcutaneous and intramuscular therapy, orthopedic measures, removal of foci of infection and physical therapy. All of this causes a long period of inactivity and involves financial outlay.

And, again, a problem presents itself a second time because some types of treatment which are indicated in a great many cases are not generally accessible. This is often true of physical therapy and orthopedic procedures. Subsidized institutions might be a means of providing adequate treatment to the large number of disabled "rheumatic" patients. Institutional treatment might insure better control of the rheumatic patient by removing him from disturbing home factors. It might also provide occupational therapy.

While the aim should be to prevent deformity, delay of the patient in seeking medical aid or some other factors sometimes makes this impossible, but he can be taught to adjust his life to meet his altered capacity. At the same time he needs to be re-educated so he will have an optimistic outlook in general but will be prepared for and alert to recurring symptoms and will again seek treatment.

"Rheumatism" has been with us in its various forms long enough to show clearly that it is not a group of diseases that will disappear of their own accord. Evidence in fossil form demonstrates that it occurred in animals ten and fifteen million years ago, continuing through the age of reptiles and the early

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evidence of man. Possible indirect evidence is the importance which the Greeks and Romans placed upon hydrotherapeutic measures perhaps in an effort to seek relief from "rheumatism".

"Rheumatism" as one of the oldest enemies of mankind deserves to be dealt with energetically. Nothing will be accomplished by only passive words of approval. More and more data are being collected which will eventually force wholesale acknowledgment of the need for action and the demand will come from all for early diagnosis and treatment rather than the isolated cries heard at present. It is much better that physicians as a whole take the lead now rather than answer the demand later.

In our own communities in North Carolina and Virginia no attempt has been made to judge the extent of the rheumatic problem. The first need is for surveys to accurately measure the present status and to form committees to estimate our needs and plan remedial steps. The Seaboard Medical Society has always maintained a progressive outlook and it is my sincere hope that you will see fit to accept this project as one in line with your progressive policy.

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ENDOCRINOLOGY BRIEFS.
The Parathyroid Glands.

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Because of their small size, hidden location and complicated function the parathyroid glands were not discovered until 1862 when Owen first observed them in a rhinoceros. Virchow described them in man a year later. It was not until 1888 that Sandstrom really recognized them as separate from the thyroid gland. In 1923 the hormone was first isolated.

There are four different types of cells in the glands but their functional significance is unknown. The average number of glands is four but as many as twelve have been reported. They are normally located on the posteromedial surface of the thyroid at the junction of the upper and middle thirds of the lateral lobes. As their number, so their location is extremely variable from various parts of the neck to the thorax.

Whether or not the parathyroid is under the control of the pituitary gland is still doubtful. The hormone of the parathyroids has been extracted only in impure form. The parathyroids are essential to life. Their hormone controls the calcium-phosphorus levels and ratio in the blood and secondarily in the bones and other tissues of the body. Overactivity or tumor formation of the parathyroids is responsible for certain disorders while underactivity or absence of the glands is responsible for syndromes of an entirely different nature.

Hyperparathyroidism is a rare disease. It was first adequately described by von Recklinghausen in 1891 and the disease resulting therefrom, osteitis fibrosa cystica, still bears his name. The disease occurs most frequently in the middle of life though there have been cases reported from infancy to old

age. It is characterized by multiple cysts and tumors of the bone with decalcification and general softening of the skeleton. There is an elevation of the blood calcium from normal of 10 mg. to as high as 29 mg. per cent. with increased urinary calcium excretion. This frequently results in urinary calculi. The blood phosphorus levels are as low as 1.5 mg. to 2.5 mg. where normal level is above 3 mg. per cent. There are general weakness and loss of muscular tone. Joint and bone aches with spontaneous fractures are common. Symptoms of urinary calculi occur in many. This association of hyperparathyroidism with urinary calculi is so striking that the finding of urinary calculus should at least suggest the possibility of this disease. Phosphatase, an enzyme capable of splitting organic phosphorus compounds, is normally 2 to 4 Bodansky units but in hyperparathyroidism may reach 20 units.

Albright has shown that a deficient ability of the kidneys to excrete phosphorus is related to parathyroid hyper-function. It seems that the kidneys in hyperparathyroidism undergo interstitial destruction which is followed by calcium deposit.

The treatment consists of removing the overactive gland. Once the diagnosis is established, surgical exploration is justified. Immediate postoperative tetany should be anticipated and emergency control planned. X-ray radiation therapy remains in the field of research.

Hypoparathyroidism represents the opposite physiological imbalance and produces hyperexcitability of the nervous system and painful intermittent spasms of the muscles. The blood calcium is below 8 mg. per cent. and the phosphorus is high. The disorder occurs after trauma or removal of parathyroid glands during thyroidectomy or it may be idiopathic. X-ray radiation has recently been reported by French writers as a rare cause. Of course, not all tetany is a result of parathyroid deficiency. Deprivation of calcium and vitamin D, diarrhoea, hyperventilation, ingestion of large amounts of sodium bicarbonate are all potential causes. Tetany is characterized by carpopedal spasms (Trousseau's sign), facial spasms (Chvostek's sign), laryngospasm and generalized convulsions. The fingernails become brittle and the teeth develop pit-like depressions of the enamel. Bilateral cataracts are frequently a complication.

Treatment of acute tetany consists of intravenous injection of at least one gram of calcium chloride, preferably diluted to .5 per cent in normal saline. Calcium gluconate in 10 per cent to 20 per cent solution is probably safer. Parathyroid extracts (Parke, Davis, Lilly, Squibb) are of equal potency and may be used 50 to 100 units daily to sustain the calcium levels in the chronic forms. A cumulative effect makes the careful regulation of the dosage important. A diet high in calcium low in phosphorus is helpful. Unfortunately, continued use of the extracts results in decreased potency and are therefore not very satisfactory.

Ohio State University workers have recently reported tissue culture and transplantation of parathyroid glands to a patient with post-thyroidectomy hypoparathyroidism and tetany. She was restored to complete physiological and clinical balance and health.

Within the past two years dihydrotachysterol, related to viosterol, has proven of great value in the management of chronic hypoparathyroidism. The drug raises the blood calcium level, indeed to the hypercalcemic stage, if the dosage is not carefully regulated. A sensitive test for determining the urinary calcium has been devised. A patient with parathyroid tetany has no calcium in the urine. When given the usual dose of 3 cc. dihydrotachysterol daily, soon the urine shows a cloudy precipitate when treated with the oxalate solution of Sulkowitch. A slightly cloudy precipitate indicates that the serum calcium is within normal range. A milky one indicates dangers of hypercalcemia. The dose is then lowered to 1 cc. three to five times weekly. The patient is taught to regulate his dose by urine tests as the diabetic is taught the regulation of his diet and insulin. Thus the management of another serious endocrine disturbance may soon be simplified to a practical basis.

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EDITOR'S NOTE: Fourth in a series of brief summaries of our present knowledge of a rapidly changing field of diagnosis and therapy.

MEDICAL ASPECTS OF PRIMARY NEOPLASM OF THE LUNG—AN ANALYSIS OF THIRTY CASES.*

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During the past two decades a new impetus has been given to the study of neoplastic changes in lungs and bronchi. With the advent of the bronchoscope and the recent advances in thoracic surgery there is now a more advantageous approach to the intelligent management of this disease than has hitherto been possible. It is obvious that these achievements will fulfill their objectives only in those cases where the attending physician has recognized the pulmonary lesion in its incipiency. A critical study, therefore, of the clinical manifestations as well as the physical findings should prove helpful in arriving at an earlier diagnosis and consequently should increase the percentage of operable cases.

Although the purpose of this paper does not include a discussion of the pathologic types of lung tumors, the recent study by Womack and Graham[1] indicates that many of these growths were originally benign mixed tumors which underwent malignant changes as a later phase in their development. A restudy of the physical diagnosis of chronic pulmonary diseases is therefore essential in the early recognition of this lesion.

Historical.† We are indebted to Bell who, in 1846, made the first clinical diagnosis of a pulmonary neoplasm. However, the honor of having first described a case belongs to Morgagni[3] who, in 1761, presented an instance in which necropsy revealed an ulcus cancrosum of the lung. By 1787 Reinhardt[4] collected twenty-eight cases from the literature and in 1904 Sehrt gathered 177 instances from medical writings. The first outstanding American contribution to the subject was Adler's Monograph,[5] published in 1912, in which 374 cases were tabulated. Symmers' of Bellevue Hospital discovered three cases in 5,000 autopsies prior to 1917 and twenty-nine in 6,000 autopsies during the period from 1919 to 1925. Bonner,[6] in 1930, concluded that primary carcinoma of the lung accounts for 5-10 per cent of all deaths from cancer. Most comprehensive of American studies concerning the increased incidence of pulmonary carcinomas is that of Rosahn[7] based on records from the Boston City Hospital. He found that from 1910 to 1921 in 3,004 adult autopsies there were 314 cancer cases, including twenty-one cancers primary in the lung, an incidence of 0.7 per cent of all autopsies, or 6.69 per cent of all carcinomas. His analysis shows that from 1925 to 1928 the percentage of all carcinomas in the total necropsies increased 20 per cent from 10-29 to 12.35 per cent. The percentage of total necropsies revealing carcinomas of the lung, however, increased 81 per cent—four times the percentage increase of all carcinomas!

Sufficient evidence has now accumulated due to the recent intensive study of this problem in various clinics to establish its numerical relationship to carcinomas affecting other organs in the body. Wells'[8] records from Cook County Hospital show a total of 403 cancer cases involving thirteen different sites, 17 or 4.2 per cent being primary in the lung. In this summary lung tumors exceed in number those involving the breast, liver, mouth and skin.

Etiology. Opinion seems to agree that no single agent is the sole cause of pulmonary cancer. In an excellent discussion of this phase of the subject Simons[2] lists fourteen etiologic factors, all having one common quality—the production of chronic pulmonary irritation. According to his classification chronic irritation may be (1) chemical (tar fractions from roads, tobacco smoke, war gases, ores and motor exhaust fumes), (2) bacterial (influenza, tuberculosis, fungus infections, and other chronic lungs diseases), (3) mechanical (trauma and dust), (4) radio-active substances (certain types of ores).

It is not necessary to discuss in detail all these possible factors in the production of a chronic irritation of the lung but reference should be made to certain significant findings in the discussion of this phase of the subject. Heredity apparently is not a factor. Although Weller[13] believed that some individuals inherit an intrinsic predisposition to incite

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†A complete bibliography on pulmonary neoplasms can be found in the excellent Monograph by Edwin J. Simons: Primary Carcinoma of the Lung. The Year Book Pub., 1937.

proliferation of certain cells, regeneration, hyperplasia and metaplasia may play a role where malignancy develops independently in more than one organ, actual experience has shown that only sixty-four cases in 930 had a suggestive family history.

The relationship of trauma to the development of a neoplasm has been studied extensively for many years. The chief difficulty lies in the fact that no anatomic proof can be given that the injury *per se* is not more than coincidental in spite of a number of highly significant cases on record. Luckow,[11] for example, reported the case of a man who developed a pulmonary carcinoma fourteen years after a splinter of granite had become embedded in the upper left lobe. Although similar instances are found in the literature one may logically accept the principle that a single traumatism may lead to a chronic irritation which in turn may develop proliferative changes.

One of the most interesting phases of this subject is the high instance of pulmonary cancer among the miners in certain localities. For example in 1926 the Committee on Cancer Research in Saxony studied 154 workers in the Schneeberg Mine and in four years twenty-one of them died, of whom eight had definite carcinoma of the lung. The dust of these mines contains cobalt, bismuth, nickel, arsenic, fungi and radio activity, all of which may cause chronic inflammatory disease of the lung, but no experimental malignancies have ever been produced by these agents. Although there is no evidence available, many authors believe that radium emanations over a period of years may be the provocative factor in these mines.

To what extent tar particles contribute to the increase in pulmonary cancer is highly debatable. It is known that tar both clinically and experimentally is a potentially carcinogenic substance and in some countries its use on the roads has been followed by an increase in pulmonary neoplasm. Goltz[12] has contrasted the annual application of half a million tons of tar on the roads of the United States with the fact that in Hong Kong none of it is used and cancer of the lung is a rarity. This comparison, however, does not hold in every country and the case against tar is, therefore, not settled.

Closely linked with the possible role of tar is the evidence against tobacco. The recent sale of a cigarette holder which encloses a cigarette through which the smoke is filtered is a graphic demonstration of the amount of tar resin introduced into the bronchial passages in the course of a day. The incidence of smokers in some series is remarkably high although Vinson[10] noted the fact that only seventy of 140 cases of carcinoma of the tracheobronchial tree, at the Mayo Clinic, were smokers. Tobacco smoke as a lung irritant may be considered at least a possible cause of pulmonary malignancy in susceptible individuals but not necessarily a major factor.

In any event, all known etiologic agents have in common the one characteristic of producing pulmonary irritation and, since they are so diverse, the only conclusion possible is that such irritation is the real activating or causative factor in the disease. Simons asserts that the reduction of all the present known facts to one formula is a positive result of the work so far performed.

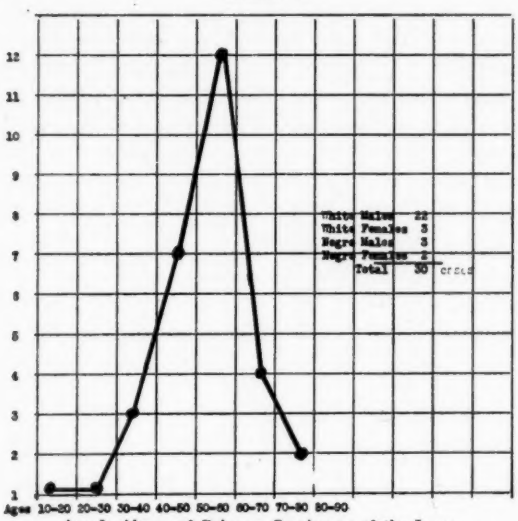
Clinical Considerations. The major portion of the contributions on carcinoma of the lung have dealt with the increased frequency of the disease and particularly with aspects of its pathology, etiology and surgical treatment. Unfortunately its clinical features have not been stressed and few articles have attempted to treat them exhaustively.

In its incipiency carcinoma of the lung is entirely a medical problem. Rarely if ever does a patient consult a thoracic surgeon or a bronchoscopist because of the early manifestations of the disease and it is for this reason that the responsibility for a prompt diagnosis rests largely on the shoulders of the internist or general practitioner. If the mortality is to be reduced or, to express it another way, if there is a curative stage in this malady, the lesion must be recognized before the tumor has spread beyond the confines of the original site.

In an effort to evaluate the clinical manifestations and especially the earliest symptoms, the writer has made a study of thirty cases of primary carcinoma of the lung taken from the records of the Hospital Division of the Medical College of Virginia and St. Elizabeth's Hospital. Obviously routine histories are often lacking in essential details and vary according to the skill of the recording physician. It is apparent, therefore, that the incidence of many significant signs and symptoms are not as high as a restudy of these cases might show. There were twenty-five males and five females and their ages ranged from fourteen years to seventy-three. Of

this series 40 per cent were in the sixth decade (Table 1).

TABLE 1



Age Incidence of Primary Carcinoma of the Lung.

In a discussion of the general clinical features of carcinoma of the lung it must be remembered that the symptoms will depend upon the anatomic location and mode of behavior of the neoplasm. A small lesion developing in a bronchus may produce a cough or possibly a hemorrhage. As the bronchus becomes obstructed atelectasis will be produced and varying grades of dyspnœa will follow. The sequelae from obstruction are, as a rule, atelectasis, bronchiectasis and often abscess formation. Sputum in the beginning is scanty but as the process continues the expectoration becomes increasingly more profuse and purulent. In cases of parenchymal or peripheral tumors cough is either entirely absent or occurs as a late manifestation. Pain is one of the earliest complaints owing to involvement of the pleura. As a matter of record in patients who have passed middle life without cardiac disease pain in the chest is highly suggestive of malignancy. It is always on the same side as the neoplasm, yet it may be referred to the neck, shoulder, back or arm. It does not disappear with effusion or tapping and, unlike the pain of pleurisy, it is not aggravated by breathing. In our series it occurred as an initial symptom in 40 per cent, and during the course of the disease it was reported in 60 per cent of the cases. It is highly probable that in more accurately recorded histories this manifestation would have ranked much higher. Although cough occurred as an initial symptom in thirteen of our cases it was complained of at some time during the illness by twenty patients. It is usually dry and paroxysmal at the beginning but later it is prone to become continuous and may be associated with wheezing or asthma (Table 2).

TABLE 2

1. Cough	13 times
2. Pain	12 times
3. Dyspnœa	9 times
4. Hemoptysis	9 times
5. Weakness	4 times
6. Resp. Infect.	8 times
7. Loss of Weight	3 times
8. Chill	1 time
9. Hoarseness	1 time

(A)

Earliest symptoms and their incidence in thirty cases of carcinoma of lung.

Right Upper	8 times
Right Middle	5 times
Right Lower	7 times
Left Upper	7 times
Left Lower	8 times

(B)

Lobes primarily involved in thirty cases.

Dyspnœa is not a strikingly early symptom but as the new growth increases in size shortness of breath becomes one of the most commonly observed complaints. It was present nine times as an initial symptom and was found in the records of twenty patients during their illness. Dyspnœa in pulmonary neoplasms is ascribed by Carlson and Ballou[9] to a variety of factors such as pleural effusion, obstructive emphysema, increased intramediastinal pressure and alveolar involvement. It has been noted that dyspnœa with the exception of cough is the most constant symptom of pulmonary cancer.

Contrary to expectations, loss of weight is often late and may be absent. In our series only three patients showed this symptom in the early stages and only fourteen records were found in which it occurred as a late manifestation. Less common complaints were vomiting, cyanosis, dysphagia, hoarseness, nerve involvement and sweats. Dilated chest veins and œdema of the face, neck and arms are usually late symptoms and indicate obstruction to the return flow of blood from the head. In one case there was evidence of blockage of the superior vena cava as manifested by extreme cyanosis of the face and cord life veins extending down over the

chest toward the abdomen. At autopsy the neoplasm had completely encircled the vena cava permitting only a small opening to the heart. Hoarseness resulting from paralysis of the laryngeal nerve is always an ominous sign, especially if it is associated with pleural effusion (Table 3).

TABLE 3

Dyspnœa	20 times
Cough	20 times
Chest pains	17 times
Hemoptysis	17 times
Loss of wgt.	14 times
Weakness	15 times
Expectoration	14 times
Fever	14 times
Sweats	6 times
Vomiting	4 times
Hoarseness	3 times
Dysphagia	1 time

(A)

Frequency of symptoms complained of during the course of the pulmonary neoplasm in thirty cases.

Lung dullness	22 times
Limited expansion	19 times
Rales	13 times
Sup. breath sounds	17 times
Pleural fluid	14 times
Emphysema	10 times
Leucocytosis	13 times
Anemia	4 times
Club fingers	4 times
Cyanosis	3 times
Dilated veins	3 times
Obst. to vena cava	1 time
Horner's syndrome	1 time

(B)

Frequency of physical signs noted during hospitalization.

The physical signs were strikingly suggestive in 60 per cent of our cases. One of the chief difficulties in the diagnosis of pulmonary carcinoma lies in the fact that the physical findings are variable and not peculiar to the disease. However, when they are combined with certain symptomatology an intrapulmonary neoplasm must be considered among the first pathologic possibilities. According to Smith, Lerman and Rosahn the earliest physical signs are limitation of expansion, dullness, and decreased or absent breath sounds. *It is a widely accepted fact that the most characteristic single finding in early as well as late cases is suppressed breath sounds over a limited area.* This is the result of an atelectasis caused by bronchial stenosis.. It was present in seventeen of our records. If any sign may be considered pathognomonic this finding of suppressed breathing more nearly fulfills this role than any other clinical observation. Lung dullness was recorded in twenty-two of the thirty histories, exceeding all other physical findings in this series. In eighteen instances there was an appreciable limited expansion on the affected side.

Rales are of indefinite significance owing to their association with so many types of respiratory infections. They were found thirteen times in our records.

These pulmonary findings vary widely according to the secondary changes occurring in the lung following the invasion of the neoplasm. As a result of a bronchial obstruction a suppurative process in the lobe is prone to develop, terminating in bronchiectasis, pneumonic areas or actual formation of abscesses.

Pleural fluid was recognized in fourteen cases and an emphysema in eleven cases. The presence of pleural fluid is quite significant in the diagnosis of the disease. The fact that it was found in 45 per cent of the series is indicative of its importance. In approximately one-half of these cases it was bloody. A hemorrhagic pleural exudate indicates malignancy in virtually all chronic cases not associated with trauma. A cytological examination of the pleural fluid often reveals malignant cells and should be included in the examination of every patient. In our series positive findings were present in 6, or 20 per cent of the cases.

An interesting finding is the presence of clubbed fingers. Although it was noted in only four cases, it is comparable to Nicholson's report of eighteen in 100 records. Its significance is not clear but it is apparent that it can occur as a result of pulmonary carcinoma alone.

An examination of the blood adds little to the recognition of a long neoplasm. Although there was a leucocytosis in thirteen cases its presence can be explained on the basis of a secondary suppurative process and not indicative of malignancy. It is surprising to note that in only four instances was there any appreciable anemia.

An analytical review of the diagnostic findings in thoracic neoplasm would not be complete without reference to our reliance on roentgenologic examinations. In this series it gave valuable evidence in each case. Rarely do the X-ray findings, however, present features pathognomonic of the disease, for

there are no definite criteria by which a diagnosis of carcinoma of the lung can be made from the roentgenogram alone. In Vinson's[10] series it demonstrated a shadow in 136 of 140 cases although the actual diagnosis was made by other means.

The scope of this paper does not include the highly important and almost indispensable role of bronchoscopy. In those instances where a small bronchogenic neoplasm is producing no symptoms other than a cough or slight bleeding this procedure will often establish a diagnosis at the optimum time for operation.

Differential Diagnosis. In the light of autopsy reports one of the most impressive facts is the high percentage of cases of pulmonary neoplasms incorrectly diagnosed. Although errors are made in both directions the evidence indicates that the preponderance of mistakes arises from the failure to recognize the malignancy rather than to construe inflammatory lesions or some form of vascular pathology as a pulmonary growth. Askin and Wagner expressed the opinion that twenty years ago only 5 per cent of the cases of lung cancer were diagnosed clinically, while today about 50 per cent are recognized during life. They are convinced, however, that at least nine of ten cases can be diagnosed clinically.

Bergmark lists the following most common causes for a mistaken diagnosis. First, carcinoma of the lung misleads by simulating tumors of a different nature in the thoracic region, such as mediastinal swellings, cancer of the esophagus, and aortic aneurism. Second, it causes diagnostic difficulty by imitating different inflammatory lung disorders, especially when secondary lung changes obscure the true picture. Third, primary pulmonary cancers may assume the appearance of cardiac insufficiency. Fourth, signs of nerve, bone and liver metastasis may obscure the true primary pathology. Fifth, general symptoms may predominate the picture.

Probably the most difficult lung disease to differentiate from pulmonary carcinoma is tuberculosis. In some instances the signs and symptoms can be so similar that it may be impossible at times to make a distinction. The fact that tubercle bacilli may be found does not necessarily exclude a neoplasm because both lesions may be present coincidently. Fortunately this combination is comparatively rare. In the Jefferson Hospital at Philadelphia the records show that one in every 250 cases diagnosed as tuberculosis had a pulmonary cancer. Repeated sputum, roentgenological and bronchoscopic examinations are usually sufficiently typical of one of the other diseases to make a definite differentiation.

Bronchiectatic cavities are often confusing and tend to add to the difficulties in reaching a correct diagnosis. In many cases bronchiectasis is the result of a bronchial occlusion caused by carcinoma as a consequence of which the finding of malignant cells either by bronchoscopy or biopsy is the only method by which a proper differentiation can be made. Generally speaking, however, simple bronchiectatic cavities may be recognized by the history of long duration, the profuse purulent fetid expectoration and the hectic temperature curve. Intrabronchial lipiodol injections also will often help in distinguishing these conditions.

Lung abscesses are almost invariably preceded by some acute inflammatory disease, some surgical procedure or the aspiration of a foreign body. Consequently they give a history of a sudden onset in contradistinction to the usually slow insidious onset of pulmonary cancer. Other pulmonary lesions can as a rule be recognized without difficulty by ordinary examinations.

Aortic aneurisms often present diagnostic difficulties in their differentiation from lung neoplasms owing to the similarity of many of their signs and symptoms. In one of our cases it was many weeks before the vascular lesion could be excluded. The difficulty usually arises in obese individuals where an expansile pulsation cannot be seen fluoroscopically nor can the aneurismal bruit be felt through the thick chest walls.

Diseases of the mediastinum, including leukemia, lymphosarcoma and Hodgkin's disease may closely simulate a bronchogenic carcinoma and require detailed diagnostic studies. If these clinical entities are considered in each doubtful case the probabilities of a correct diagnosis are greatly enhanced.

Unfortunately many cases of lung neoplasm produce no signs or symptoms during their early states, and, likewise, many are beset with contradictions as well as imitations of other diseases.

The diagnosis of primary carcinoma of the lung constitutes a baffling problem to the practicing physician unless he has become cancer conscious. If he is to succeed diagnostically he must consider every stubborn pulmonary symptom as a portentous sign and exhaust every method of diagnosis at his dis-

posal. Carcinoma of the lung is the great masquerader of thoracic diseases and follows no definite clinical pathway.

SUMMARY

1. Primary carcinoma of the lung has apparently increased with startling rapidity within the last few decades. A discussion of various possible etiologic factors is given with the conclusion that the resulting chronic local irritation is the most probable cause.

2. A group of thirty cases of primary neoplasm of the lung is analyzed from the standpoint of age, sex, symptoms, and physical signs. According to this study a man in his sixth decade is the most likely victim of this disease. Although the signs and symptoms vary with the size and location of the tumor the most significant physical finding is a suppression of the breath sounds over a localized area. This is due to an atelectasis resulting from a bronchial stenosis.

3. Carcinoma of the lung is a masquerader of all chronic pulmonary diseases but the greatest difficulty lies in the differentiation between it and tuberculosis.

4. With the advent of the bronchoscope and the recent advance in thoracic surgery there is a more hopeful attitude toward the outcome of these cases provided they are recognized in their incipiency. An effort is made to point out the early manifestations.

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HERPES SIMPLEX OF THE LIPS—A NEW METHOD OF TREATING THE SOLITARY VESICLE.

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The cause of herpes, or fever blisters, is unknown. It is thought to be of bacterial origin and a virus has been isolated which will pass through a special filter. The lesions are frequently seen after gastrointestinal disturbances, respiratory infections, colds, sunburns, toxic and febrile states and reflex irritation. The eruption is usually observed on the face, ears and genitals. The lesions are usually multiple, vesicular in type and on erythematous and edematous bases. The exudate from the vesicles is both auto and hetero inoculable. It was suggested at one time that herpetic lesions were a terminal neuritis. The large solitary lesion often seen on the lip is sharply localized and the most disturbing and disfiguring. The vesicle is usually well below the surface and is tender and painful. The walls of the lesion are thick and have slight tendency to spontaneous rupture and rarely suppurate. The pain and irritation is due to pressure within the vesicle.

The lesion may persist for many days until the tension is relieved by rupture and the escape of the fluid. If the lesion is untreated the vesicles after many days usually dry up and yellowish crusts are formed which are either removed with the fingers or licked off by the tongue. Many of the large single vesicles which occur on the lips, if carefully inspected with a good magnifying glass, will be found to have the pattern of a small wheel. The number of

partitions vary from four to eight. Recently I studied a lesion on my own lip and there were five segments.

The treatment which I have used on a number of patients and on myself consists of multiple punctures with a sterile, fine hypodermic needle. When this simple procedure is followed the tension is immediately released, the itching and burning relieved and a scab will quickly form and the lesion will usually heal within a week.

159 North Dearborn Street.

PARALYTIC ILEUS AND INTESTINAL OBSTRUCTION SIMULATED BY DISEASE OF THE URINARY TRACT.

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INTRODUCTION

Some affections of the kidneys and ureters, especially calculi, may cause the clinical signs and symptoms of a paralytic ileus. Distention of the intestines, at times of the stomach as well, vomiting and obstipation are confusing signs of urinary tract disease. The purpose of this paper is to present four cases of renal disease which simulated paralytic ileus or intestinal obstruction and to discuss the physiologic reactions causing this syndrome. Although this clinical syndrome has been known since Wilms[1] first applied the term "Nierenileus" in his classical monograph on ileus, we offer this emphasis because of its evident scarcity in the medical literature. Our recent experience is the more pointed as in one of the cases the error in diagnosis led to an unnecessary abdominal operation. The symptomatology of renal disease may so mimic obstruction of the intestine that one may have considerable difficulty in deciding on the course of treatment best for the patient.

According to Chute and Kelley,[2] the most common urinary tract disturbance simulating intra-peritoneal disease is a ureteral calculus. Tixier and Clavel[3] called this the "retroperitoneal syndrome" and they stressed the importance of surgical diseases of the kidney, tumors and trauma as causative factors. The frequency with which an acute renal or ureteral lesion may be confused with appendicitis, pancreatitis or with lesions of the liver or biliary system makes these differential diagnoses well appreciated.

Case I—No. 53698: A seventy-six-year-old Belgian housewife entered the hospital on September 17, 1938, with the complaint of pain high in the right flank, in the epigastric region and with vomiting.

One year before entry she stated that she had had a steady pain in the right flank which had radiated to the right groin. It was not accompanied by vomiting and had not been severe enough to cause her to seek a doctor but the pain had returned at irregular times throughout the year. There were no symptoms referable to the genito-urinary tract. The evening before admission she again had pain in the right flank accompanied by nausea and vomiting.

Physical Examination: Temp. 101.6 F. per rectum; resp. 28; B. P. 132/50. She was an ill, elderly, fairly well nourished woman with a distended abdomen. There was a complete adenture and the tongue was heavily coated. Examination of the lungs revealed chiefly a few moist rales at both bases. The heart was slowly fibrillating. The abdomen was definitely above the thoracic plane and pain was elicited on palpation high in the right flank and in the epigastric region. No masses were palpable. On auscultation high pitched peristaltic sounds were heard only over the right lower abdomen. The remainder of the physical examination was not remarkable.

Laboratory Examination: The white blood cell count was 8,850. The urine was clear, amber, acid, without sugar, but a trace of albumin was present. Occasional red and white blood cells were seen on microscopic examination. Blood serum Wassermann was negative.

The house staff was of the opinion that this patient had a renal calculus on the right side and the

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consultant in urology agreed to this diagnosis. However, continued epigastric pain, vomiting, abdominal distention and the high pitched peristaltic sounds led the visiting surgeon to the conviction that the patient had intestinal obstruction. A Levine tube was passed but no relief was obtained. Intramuscular digitalis was given with improvement of the moderate congestive heart failure. On the third hospital day under local novocaine anesthesia, a right gridiron incision was made and this revealed an extremely distended caecum. Because of her precarious condition only a cecostomy was done and the wound closed. Following the operation the tube was irrigated at regular intervals with warm saline which produced good fecal returns and some deflation of the abdomen. The day after the operation the urinalysis showed only a slight trace of albumin and eight to ten white cells and an occasional red blood cell per high powered field.

The patient showed some improvement until the sixth hospital day when she again complained of pain in the right flank, in the epigastric region, and burning on urination. During this time the auricular fibrillation continued and both lung bases had gradually become filled with moist rales. She began to take less by mouth and finally refused to swallow fluid or food. Her condition turned for the worse and she expired on the eighth hospital day.

Autopsy: No. A-38-16. The examination was limited to the abdomen. No evidence of obstruction in the entire gastro-intestinal tract was found. The right kidney showed some hydronephrosis and just below the right uretero-pelvic junction was a calculus 4 x 8 mm. in size. The pathologist's only diagnoses were a right ureteral calculus with hydronephrosis and acute cystitis. The cause of death was not exactly determined.

Case II—No. 52981—(Courtesy of Drs. Carl Glazer and H. Marble): A thirty-three-year-old married Hebrew salesman was admitted on May 15, 1938, to the hospital with the complaint of a sudden pain in the right flank.

He had been awakened the night before with a sharp pain in his right flank which had recurred at short intervals and was not relieved by several doses of morphine. This pain radiated only to the umbilical area. Since the onset of these symptoms he had passed neither gas nor feces and the abdomen had become moderately distended. Several enemata in the hospital gave no returns. There had been no complaint of chills, fever, nausea or vomiting. The past history revealed that an appendectomy had been done two years previously and that lupus vulgaris of the face had been present for several years. The family and environmental history were non-contributory.

Physical Examination: Temp. 98.6 F.; pulse 72; resp. 20; B. P. 100/48. He was a stocky, thick-set man in apparent abdominal distress. The face showed scattered areas of lupus vulgaris. The head, chest and heart were normal. The abdomen showed a moderate distention which was more noticeable in the upper half and definite tenderness and spasm were elicited on palpation of the right flank; no masses were felt. Very occasional or no peristaltic sounds were heard on auscultation of the abdomen. The rectal examination showed a distended bowel that had been cleaned with enemata. The remainder of the examination was not remarkable.

Laboratory Examination: The blood showed a red cell count of 4,230,000 with 80 per cent hemoglobin and a 20,600 white blood cell count. A catheterized urine specimen was amber, cloudy, acid and no sugar was present. A heavy trace of albumin was present and many red blood cells were seen on microscopic examination. Blood serum Wassermann was negative. Plain roentgenograms of the kidney areas revealed no abnormality and no shadow suggestive of a calculus was seen. A retrograde pyelogram was done which showed the right kidney and pelvis to be normal in appearance. The left ureter and pelvis were not injected but the urologist noted some bloody urine coming from the left ureteral orifice. There was no visible stone in the urinary tract. The right ureteral catheter yielded urine containing small clots and the microscopic examination showed many crenated red cells and rare clumps of white cells but no casts were seen.

Throughout the night and morning following admission the patient suffered severe abdominal pain, only partially relieved by morphia. Increasing distention of the abdomen, vomiting, inability to evacuate gas or feces and a rising blood non-protein nitrogen turned opinions to a final pre-operative diagnosis of intestinal obstruction rather than renal disease. He was removed to the surgical amphitheater and while there on the table he was again examined. This time a few more peristaltic tinkles were heard and so the operation was postponed. The white blood cell count was then 25,000.

The patient continued to complain of severe ab-

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dominal pain and distention. On the third hospital day the non-protein nitrogen was 63 mg. and on the fourth day it rose to 68 mg. By the eighth day after admission it had dropped to 53 mg. and the abdomen began to decompress and the patient became more comfortable. Daily urine examinations showed a gradual increase in the number of red blood cells and white cells in clumps began to appear. Flatus and some feces were first passed on the fifth hospital day. Enemata were repeated at regular intervals with a gradual increase in both fecal and gas returns. On the thirteenth hospital day the urine was normal except for ten to fifteen white blood cells per high powered field. The patient was finally discharged free of symptoms on the fourteenth hospital day.

Case III—(Courtesy of Dr. W. S. Walkley): A twenty-year-old Italian-American male complained of pain in the right side of the abdomen from the costal margin to the symphysis, extreme abdominal distention and vomiting.

The patient stated that all the signs and symptoms had begun twelve hours previously. He had noticed that the first symptom was pain in the right half of the abdomen followed by gradual and persistent distention of the abdomen and vomiting. On close questioning, he had recalled that the amount of urine voided had decreased.

Physical Examination: Temp. 99.2; pulse 102; resp. 28; B. P. 128/60. He was a young, well nourished male in considerable discomfort with abdominal distention and pain. The chief point of interest was the abdomen; there was moderate distention and some spasm of the right half and no peristaltic sounds were heard. There were signs of moderate dehydration. The remainder of the physical examination was not remarkable.

Laboratory Examination: The red blood cell count was 4,620,000; hemoglobin 85 per cent; the white blood cell count was 10,600. The urine was normal except for an occasional red and white blood cell seen on microscopic examination.

The patient was treated conservatively by giving normal saline solution intravenously and morphia. Nothing by mouth was allowed. Two days after the onset of pain the urine was loaded with red blood cells, and a roentgenogram of the abdomen showed a stone in the bladder. On the third day flatus and feces were passed with definite decompression of the abdomen and the patient was greatly relieved. He was discharged symptom free on the fifth day.

Case IV: A forty-four-year-old married housewife complained of extreme abdominal distention, a "gassy" feeling and nausea.

She stated that four years previously she had a steady, boring pain in the left costo-vertebral angle that had been accompanied by distention of the abdomen. This attack had lasted four days and she did not consult a doctor. Two years later she had two more such attacks but of shorter duration. The present attack was a return of the same boring pain but it had become so severe that she finally called a physician. She had passed neither gas nor feces for the previous two days and the urine output had also noticeably decreased.

Physical Examination: Temp. 101.8 F.; pulse 112; resp. 26; B. P. 148/80. She was a well nourished woman with extreme abdominal distention and pain on heavy percussion over the left costo-vertebral angle. On auscultation of the abdomen no peristaltic sounds were heard. The remainder of the physical examination was not remarkable.

Laboratory Examination: Red blood cell count was 4,610,000; 83 per cent hemoglobin; white blood cell count 9,860; urinalysis was normal and only an occasional white blood cell was seen on microscopic examination.

The treatment consisted of giving normal saline solution intravenously; nothing by mouth was allowed. Four days later she began passing gas and had a normal bowel evacuation. The abdomen became softer and of more normal proportions. A roentgenogram of the abdomen was then taken and the shadow of a small stone was seen in the region of the left kidney pelvis. The patient refused further treatment and was discharged temporarily symptom-free.

The physiologic processes governing intestinal motility are dependent on the muscle structure, the intrinsic nerve supply of the intestinal wall and the extrinsic supply through the splanchnic and vagus nerves.[4] The intimate nature of the connection between the nerve supply of the intestine and the kidneys and its clinical effects were clearly emphasized by Eisendrath[5] in 1916. Injury to the intestinal wall or to the nerves supplying the wall may abolish normal intestinal motility. Likewise reflex impulses rising in distant tissues and coming over the extrinsic nerves may produce atony of the intestinal walls and

thus produce the clinical signs of ileus. Experimental observations on dogs by Tixier and Clavel[3] have established the fact that renal and perirenal stimulation diminish intestinal motility, particularly that of the colon. Cannon[6] showed that the paralytic ileus following a crushing injury of cat's testicles was due to an inhibition of motor function conveyed through the splanchnic nerve.

Normally the extrinsic nerve supply of the bowel maintains the tone of the intestinal musculature by impulses from the central nervous system transmitted over two opposed systems; first, the motor nerves in the vagi and sacral autonomic, whose influence becomes lessened in the lower intestinal tract, and, second, the splanchnic carrying inhibitory nerves to the intestinal musculature and motor fibers to the pyloric and ileocaecal sphincters. It is well known that stimulation of the sympathetic causes an increased output of adrenalin, which, in turn, stimulates the inhibitory (splanchnic) nerves of the intestine and motor nerves to the sphincters.

Both the vagi (motor) and the splanchnics (inhibitory) contain afferent sensory pathways from the kidneys, ureters and perirenal tissues. The receptors of these sensory nerves are great stimuli, reflexly through the ganglia, pass out over the efferent pathway of the splanchnic and, as they are far stronger than the normal tone produced over the vagi and sacral nerves, they bring about a clinical state of ileus augmented by a closure of the pyloric and ileocecal sphincters and an increased secretion of adrenalin. Thus it seems clear that it is over the extrinsic nerve supply of the intestine that diseases of the kidney affect intestinal motility.

Alvarez[7] has stated that renal colic may simulate obstruction of the bowel but he added that the location and radiation of the pain and the fact that it is violent from the beginning should point to the correct diagnosis. We agree in this and, further, in reaching a decision that a patient has a surgical abdomen, the utmost care should be taken to determine the location of the *first* pain and its subsequent radiation. Unfortunately, these clinical observations did not settle the issue in *Cases I* and *II*. *Cases III* and *IV* presented similar characteristics but the location and radiation of the pain led to the correct diagnosis.

The cardinal physical signs of intestinal obstruction are pain, vomiting, obstipation, abdominal distention and loud sounds of peristalsis heard best on auscultation of the abdomen. The chief and often only sign to differentiate such obstruction from paralytic ileus is the difference in the ausculatory findings. Usually ileus leads to a silent abdomen or at least a diminution in peristaltic sounds. However, active peristalsis in an isolated loop of bowel in *Case I* produced the signs which convinced the surgeon that abdominal exploration for intestinal obstruction was necessary. In ten elderly patients with intestinal stasis associated with transient renal insufficiency reported from the Mayo Clinic two were explored without discovering obstruction.[8]

It is of interest that the symptoms and signs of ileus disappeared only after three to five days of conservative treatment in our cases. We believe that the uneventful recovery of the last two patients was in great part due to this conservative treatment of replacing physiologic fluid parenterally and forbidding food or liquid to enter the paralyzed intestinal tract.

The diagnosis in *Case II* is still uncertain. Renal calculus seems to have been excluded by roentgenogram, as we know that about 96 per cent of ureteral stones are demonstrable by X-ray, provided, as Peterson and Holmes[9] insist, that the films be carefully studied with the full clinical history in mind. Because the bleeding in this case was bilateral, we turned to a final diagnosis of acute hemorrhagic nephritis with congestion of the kidney as the cause of pain. Cortical necrosis, infarction of the kidney, pyelonephritis and heavy metal poisoning seemed less likely. Uremia in mild degree was present and this we know may cause primarily intestinal symptoms.

Although Tileston and Comfort[10] in 1914 first observed a high blood non-protein nitrogen associated with vomiting and intestinal obstruction, the single finding of nitrogen retention has since confused clinicians into making a primary diagnosis of uremia in such cases. Continued vomiting or loss of intestinal secretions from other causes withdraws both the sodium and chloride ions from the blood plasma. Next to the enormous reduction of chloride[11] and resultant increase of the plasma bicarbonate in such cases the most conspicuous change in the blood chemistry is the increase in the non-protein nitrogen. Recently Jeghers and Bakst[12] have listed the other causes of such extra-renal azotemia. This sequence of a rapid loss of intestinal contents and such profound changes in blood chemistry has also been called "achloremic uremia" and its explanation

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makes even clearer the physiologic dependence between the kidneys and the intestine.

SUMMARY

Four cases are presented in which diseases of the urinary tract simulated paralytic ileus and intestinal obstruction. The basis for this syndrome is the physiologic reaction over the extrinsic nerve supply of the intestinal wall. Stimuli arising in the kidney regions, reflexly over the splanchnic and vagus nerves, produce atony of the bowel wall and closure of the pyloric and ileocaecal sphincters. Adrenalin, released by the sympathetic stimulation, heightens this action. Conservative treatment of these patients usually affords relief in three to five days if physiologic fluid is restored parenterally and substances by mouth are restricted.

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UNUSUAL GUNSHOT WOUNDS—CASE REPORTS.*

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Before going into the case reports I would like to say a word about gunshot wounds in general. Gunshot wounds have been defined as: "Contused or contused-lacerated wounds inflicted by explosives."[1] By this definition many wounds sustained in civil life such as those inflicted by missiles hurled by dynamite or powder blasting, or explosions in our numerous industrial plants (though frequently not considered as such) are in reality gunshot wounds as are the wounds of war such as the shrapnel, exploding mine and many other destructive devices designed by man to destroy which might not be considered fire-arms in the ordinary interpretation of the word.

The cases under consideration in this report are confined to wounds inflicted by fire-arms of ordinary civil life such as the revolver and automatic pistol, sporting rifle and shotgun. This type of fire-arms has undergone a certain amount of change in comparatively recent years. In the recollection of the most of us present the projectiles from civilian fire-arms were almost entirely of soft lead. These soft projectiles were battered and deflected by the skin, tendons, bones, fascia, etc., so that in the large majority of cases when the missile entered the body it penetrated only a short distance and did not make an exit. The steel and copper jacket, pointed bullets, high explosive cartridges in common use now, have changed this so that in most cases of bullet wounds the missile enters and leaves the body. This alters the old treatment to the extent that instead of probing for a lead bullet we see the point of entrance and the point of exit and wonder what has happened between these two points. Where the soft bullet would

*Read before the Patrick-Henry Medical Society, at Martinsville, Va., January 5, 1940.

1. Modern Surgery: DaCosta. Ninth Edition, p. 206.

probably only embed itself in an organ or against a bone where in most cases it could be removed with a probe, the faster propelled hard bullet shatters the organ or bone and may drive fragments of bone to other parts of the body, doing irreparable damage as it travels, making necessary extensive operations, debridements, ligations and amputations.

I will now give you some case reports on wounds from the high powered type of weapon:

Case 1: Mrs. B., a woman twenty-three years of age, admitted to Stuart Hospital March 5, 1939, at 8:25 P. M. On admission she was complaining constantly of severe abdominal pain.

Examination revealed a bullet wound of entrance in the upper right abdominal quadrant ranging down at an angle of about forty-five degrees. There was no external wound of exit. The entire abdomen was rigid. The uterus was enlarged above the umbilicus and she was thought to be about seven and one-half months pregnant. No fetal heart sounds could be heard.

A diagnosis of perforated viscera with involvement of the uterus was made. The abdomen was opened at 10:00 P. M. on the night of admission. Six perforations of the small intestines were found and repaired. The uterus was perforated, the bullet entering the fundus and leaving at the lower posterior surface. The spent bullet was found free in the abdominal cavity behind the uterus. A classical Caeserean section was done, after which the bullet wounds in the uterus were repaired. The foetus was shot through the chest posterior to anterior and was, of course, dead.

The patient underwent a somewhat stormy convalescence for about four days and then on to an uneventful recovery. She was discharged from the hospital March 26, 1939, making twenty-one days in the hospital or a slightly longer confinement than the average Caeserean case.

Case 2: Mr. L. T., a man twenty-six years of age, admitted to Stuart Hospital shortly after midnight on December 10, 1938. One admission he was in extreme shock and could tell little more than that he was shot.

Examination revealed a bullet wound of entrance one inch below the left nipple and just to the left of the nipple line. Probing showed that the bullet entered the chest traveling in the general direction of the spine. The wound was bleeding freely. Except the above mentioned shock and wound nothing else of clinical significance was found. A tightly bandaged dressing was applied to the wound and the patient treated for shock by the usual procedure—morphia, external heat, etc.

The patient underwent a very stormy convalescence with violent vomiting and hiccoughs which were only temporarily relieved by large doses of morphia or sodium amytal given parenterally, the sodium amytal probably giving the most satisfactory relief. Because of the proximity of the wound to the heart the wound was not kept open for drainage and healed in about ten days. The patient showed slight if any improvement, and on December 24, after much deliberation, a section of the left ninth rib posteriorly was removed and a tube inserted for drainage. This was done with light chloroform anesthesia. This operation was followed by free drainage of a very bloody pustular exudate. The tube was removed January 4, 1939, but the wound continued to drain with daily removal of large sloughs of devitalized tissue. X-ray showed the bullet in the soft tissues near the thoracic spine. It was not removed for the reason that the examining doctors agreed that it could do little if any harm in this area and would necessitate considerable damage to the spinal muscles to remove it.

From the time of the operation or drainage of the chest cavity the patient showed slow but steady progress and was discharged from the hospital February 12, 1939.

Case 3: Mr. R. M., a man fifty-six years of age, was first seen in the home about 2:00 A. M. on September 23, 1939. He gave a history of having been shot about two hours before. He had been a consistent consumer of alcohol all his life though he was not generally considered a drunkard. He had never previously been confined to his bed because of sickness.

Examination revealed a very robust man (weight 235 pounds). A bullet wound of entrance was found at the level of the sixth rib in the right anterior axillary line. There was no bleeding from the wound. The lower lobe of the right lung was collapsed. A large caliber bullet was palpated just under the skin at the level of the ninth rib in line with the angle of the left scapula.

Morphia was given; an ambulance was then called and the patient removed to Stuart Hospital. On the morning of September 24, or the next day after admission, blood was noted in the urine, but was not detected after that date. During the day of Septem-

ber 24 the bullet was removed under local anesthesia. There was some thin fluid around the bullet but it was thought at that time to be blood serum and not an unusual amount. The wound was closed with two sutures to control slight bleeding. On September 27 one suture was removed for drainage and there was some drainage of a light reddish fluid. A slightly nitrogenous odor suggested the presence of urine which was disproven by the location of the wound. The fluid continued to drain, necessitating the changing of heavy dressings every few hours. A rupture of the thoracic duct was suspected. This was later confirmed, when the patient was given nourishment containing fats, white chyme appeared in the drainage.

On September 28 the patient began having nervous and mental symptoms with the usual delusions and hallucinations of the alcoholic. Whiskey was administered in moderate amounts at regular intervals and the nervous and mental symptoms cleared up in a few days.

On October 15, 1939, the patient was allowed to go home. The wound in his back was draining some at that time but much less than formerly. For several days before leaving the hospital it was necessary to change the dressings only once in twenty-four hours. Although the patient was removed to his home by ambulance the drainage again became profuse and continued with gradual decrease until the wound was healed about December 10, 1939.

About the time that the patient left the hospital h developed a slight cough. The cough was not pr ductive at first but became so gradually until a abundant watery, white sputum was present. Fluid was suspected in the right pleural cavity and on October 27th 150 c.c. was removed by aspiration. The removed fluid was clear with a reddish hue very similar to the first drainage from the back wound. The cough subsided after the removal of the fluid but became troublesome again. Aspiration of the pleural cavity has been attempted on two occasions since but no fluid could be obtained on either occasion.

This man is still confined to his bed, due, in my opinion, largely to a mental state. Having never before suffered the inconvenience and pains of a sick man he knows nothing of what one can suffer and recover. He has been convinced from the first that he was going to die. I can now see no physical reason why he should not recover but, unless his mental attitude changes, and I have tried by all common sense reasoning to change it, I fear the worst for him.

This completes my case reports. In preparing this paper I have not attempted to advocate or commend any particular mode of treatment for gunshot wounds. There is only one point on which I wish to place emphasis, and that is, with the modern type of civilian fire-arms, most extensive and complicated injuries may and should be expected.

PROSTIGMIN IN THE INDUCTION OF LABOR.

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A clinical study has been made to determine whether prostigmin, a smooth muscle stimulant, produces uterine contractions sufficient to lead to true labor. This investigation promised to be of value for two reasons: 1. If prostigmin were found to be a stimulant to the uterus, it might be of value in the medical induction of labor; 2. If no such effect were found, it might be concluded that prostigmin could safely be used in the prevention of postoperative distention in pregnant women.

Schofer[1] administered prostigmin to twenty-two women at or near term, and only three fell into labor. He concluded that prostigmin may safely be used to combat intestinal distention in pregnant patients after laparotomy.

Spoto[2] gave prostigmin to six pregnant women with obstipation without causing abortion or labor.

Tietze[3] treated four pregnant patients with prostigmin without causing abortion or labor, and Uznanski[4] and Mueller[5] make similar reports.

Prostigmin resembles physostigmin in its action, and it is assumed that it acts by inhibiting esterase activity thus preventing the destruction of acetylcholine at the nerve endings.[6] In this way it produces a strong stimulation of the parasympathetic nervous

*Read before the Tri-City Obstetrical Meeting of Philadelphia, New York, and Boston, March 6, 1939.
From the Department of Obstetrics of the Philadelphia Lying-In Hospital, Philadelphia, Pennsylvania.

system. However, it has a very slight effect on the circulatory system and little miotic effect on the eye.[7]

Twenty-five normal obstetric patients who were within five weeks of term were studied. Each was given one ampoule of prostigmin 1:2000 hypodermatically at intervals of three hours for six doses or until labor started. No other medication or manipulation was employed.

Hyperhidrosis was the only untoward symptom noted during the use of prostigmin, and it occurred only once briefly in one patient after the third injection.

The following table presents the patients according to the duration of pregnancy, the condition of the cervix at the beginning of the induction, parity, the total number of injections given each patient, the presence or absence of engagement, and the results obtained.

	Patient	Dilatation of cervix in fingers	Effacement of cervix	Days from Term	Parity	Number of Injections of Prostigmin	Engagement	Results and Comments
Before Term	1	0	¼	—21	0	6	No	No contractions.
	2	0	½	—16	0	6	No	No contractions.
	3	0	½	—14	0	6	No	No contractions.
	4	0	0	—7	3	3	No	Drug stopped after 3rd injection due to contractions which did not persist after discontinuance of prostigmin.
	5	0	0	—5	0	6	No	Few pains, no real labor.
At Term	6	?	?	0	0	6	No	No contractions.
	7	1	½	—1	2	6	No	No contractions.
	8	0	0	0	0	6	No	No contractions.
	9	?	?	—2	0	6	No	No contractions.
	10	0	0	—2	1	6	No	Few painless contractions after membranes ruptured.
	11	0	0	+2	2	6	No	No contractions. Perspired freely after 3rd dose.
	12	1	0	+2	3	6	No	No contractions.
	13	2	½	+2	0	6	Yes	No contractions.
	14	2	¼	+2	7	6	No	No contractions.
	15	?	?	+5	3	4	No	Successful induction and delivery after 4th dose.
Past Term	16	?	?	+7	3	6	No	No contractions.
	17	0	½	+7	0	2	No	Successful Induction and delivery after 2 doses.
	18	0	0	+9	0	6	No	Few pains after 2 doses.
	19	1½	1/3	+9	4	1	Yes	Successful Induction and delivery after 1 dose.
	20	0	¼	+11	2	6	No	No contractions.
	21	0	0	+12	0	6	No	No contractions.
	22	0	¼	+14	0	6	No	No contractions.
	23	2	½	+17	1	6	Yes	No contractions.
	24	1	¼	+23	0	1	Yes	Successful Induction and delivery after 1 dose.
	25	2	¾	+30	0	2	Yes	Successful Induction and delivery after 2 doses.

Discussion and Summary

Five of the twenty-five patients fell into labor; one of these five was within five days of her due date; the other four were from seven to thirty days past the due date. In three of the patients the head of the fetus was engaged on admission, four patients had from one to two fingers cervical dilatation and at least one quarter effacement, and three of them were nulliparae.

Hence it is felt that for a prostigmin induction to be successful, the patient must be at or past term; and her cervix must be somewhat effaced and perhaps at least one finger dilated.

Conclusions

(1) Prostigmin is of little value when used alone for the induction of labor.

(2) Prostigmin may be administered safely to the

pregnant woman with little fear of producing an abortion or premature labor. (It is especially useful in the treatment and prevention of postoperative intestinal distention).

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1004 West Franklin Street.

THE HEALING PROCESS IN FRACTURES.*

M. H. TODD, M.D.,
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The local requirements for union of fractures may be reduced to the same terms as for healing of the other bodily tissues—good blood supply, maintenance of direct contact, rest, and avoidance or control of infection.

Union is most certain where blood supply is best, as in the small bones of children; it is slowest where blood supply is poorest, as in the neck of the femur in the aged. Blood supply is also best when the surrounding soft parts are allowed some degree of active motion; and this should always be arranged if possible, as I shall wish to indicate in a succeeding paragraph.

Direct contact of raw bone surfaces gives the optimum chance for union, though you all know that bones will heal solidly in the presence of overlapping, or even where there is some interposition of soft parts. Where the raw surface is extensive, as in oblique or comminuted fractures, union is apt to be quicker than in simple square breaks.

Immobilization should be reasonably secure, for motion disturbs the newly forming tissues to a certain extent. Absolute fixation is not, however, necessary, and I am not at all sure that it is always desirable; for the ribs and the clavicle heal promptly in spite of quite a little unavoidable motion. So do the femurs of children treated by Russell traction, or in infants by simple traction over-head, in spite of the incessant activity of these little patients, who are only prevented from turning handsprings by their weights and pulleys.

If too much motion is allowed, however, non-union may result, though this is not common. It is more apt to take place where blood supply is none too good, as in the shaft of the humerus or the tibia, or in the neck of the femur. Sherman, who plates many fractures, told me some years ago that he had never had non-union result. I have seen it twice that I recall. The firm fixation of plating does, in fact, usually hasten union, which is similarly made more certain in the neck of the femur by nailing.

The broken bone should be protected from undue motion until the soft putty of the primary callus has definitely hardened. Otherwise angulation will result. This takes three or four weeks in the child's collar-bone, maybe three months in the adult tibia, maybe a year or more in the old man's broken hip. Drugs are apparently of no value in hastening union; parathyroid may do more harm than good.

Union is hastened by active use of the extremity, and by actual pressure at the site of fracture, so long as this pressure is end-on; the newer ambulatory methods take advantage of this fact. But any shearing strain is to be avoided; that is, whatever pressure is allowed should tend to press the fractured surfaces closer together—not to pry them apart.

Bones will finally heal where you put them, or rather where they finally stay put; so don't let them heal in deformity. The deformity will all too soon become as hard as iron, resisting any attempt at correction. Angulation can take place inside a cast that looks perfectly good. It is best to check position at least once by X-ray, even though all seems well.

In the shaft of long bones, somewhat imperfect position is allowable, if the bones are at least partly end-on; but when a joint-surface is involved, hair-line reduction must be maintained, or the result will be a rough bearing, and this will give as much

*Read before the Seaboard Medical Association of Virginia and North Carolina, Virginia Beach, Va., December 14, 1939.

trouble as it would in an engine. And if less than perfect reduction is allowable in the shaft of a long bone, at least it must be lined up correctly without angulation or rotation.

There are exceptions to all these rules. I have seen solid union and fair function result where none of the above conditions were fulfilled.

How to get satisfactory position of a fracture depends on where the break is and whether it will stay put. In many fractures, a simple cast is good enough; in some shoulder injuries, nothing but a sling; in most fractures of the pelvis, little more than rest in bed; in femur fractures some form of traction ordinarily; in the upper forearm, reduction under the fluoroscope; in compression fractures of the spine, reduction by hyperextension; in intracapsular hip fractures, fixation with a pin; in ankle fractures, attention to keeping the astragalus from lateral displacement; in some fractures, open reduction. Skeletal traction and fixation have their place. Nearly all fractures can be gotten into good position in one way or another, and good functional use can be obtained in the end.

Having spoken of the bones, now let me state that the soft parts often control the eventual return of useful function. It is of no use to get solid union of an elbow fracture, if Volkmann's contracture occurs; no use to obtain solid healing of any arm fracture, if you permit the fingers to stiffen. A man's arm is after all only as useful as his fingers; and they will do their best to stiffen unless you see that they can move, and are moved actively every day your splintage is in place. Once thoroughly stiff, they may never regain really good function, massage them as much as you will. If, therefore, your splintage interferes with the normal range of motion of the finger-joints, change it until they can move through their whole range. The proximal row of knuckles is especially important, and splintage should not reach further in the palm than the "life-line". It used to be the fashion to splint a Colles' fracture with the fingers straight out on a board; this is an obsolete method which has done much more harm to the hand, than any good it could do in steadying the wrist. Modern splints allow the fingers to bend into a fist, with no loss of immobilization at the fracture.

The ankle will stiffen in foot-drop, the shoulder in adduction, if you permit; so do not permit it.

The blood supply of the soft parts may be impaired by too tight a cast. If so, split the cast, and don't forget that the underlying layer of cotton must also be split, until you can see the bare skin from one end to the other; otherwise, a remaining string of cotton will continue the constriction as if you had never split the cast. Watch especially the bend of the elbow. Blood-supply of the soft parts is once in a while impaired by arterial bleeding under the deep fascia. This usually occurs as a complication of a severe fracture of the humerus just above the elbow; and if the swelling becomes too tight, not enough arterial blood may get past the swelling into the forearm. Then the hand remains cold, and the forearm muscles almost perish and are replaced by scar, and the final result is the claw-hand of Volkmann's contracture. This is uncommon but very crippling. It can practically always be forestalled, I think, by incision directly through the deep fascia to relieve tension.

Any fixation of a fracture will cause some shrinkage of the muscles from disuse. This undesirable condition is diminished by allowing as much active function as you can; and such active use also increases the blood supply to the bone itself.

Healing of a fracture is hindered most of all by infection; and compound fractures emphasize the problems that all open wounds present. They must be treated early, as emergencies, within about six hours. Good mechanical debridement is to be done. There must be little tension in closure; use relaxation incisions if necessary; space sutures to allow some oozing of fluid, and apply gently snug dressings to avoid dead-space, but not tight enough to hamper blood supply. And, above all else, the bone must be held still. The blood supply of cortical bone is so poor that it practically constitutes a foreign body for a number of days, until such time as the newly vascularized tissue has had a chance to develop and cement it to the surrounding soft parts. Any false motion disrupts this process, and the tissues may not then be able to overcome any residual contamination, so that frank infection takes place. So don't readjust, once you have set the bone, even if it doesn't suit you.

The bone may stay in place with no fixation except a splint or a cast; or you may have to use pins or a plate. It is in order to plate and leave the wound wide open, packing with vaseline gauze or leaving carrel tubes for irrigation; or sometimes you will be lucky enough to get primary healing even over a plate.

If infection occurs, treat according to general sur-

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gical principles. And what are these? First, open the wound for free drainage, make dependent counter-drainage if necessary, irrigate with Dakin's solution if you like. But do not remove the fixation, or you will break up the healing process still further, adding displacement to your problem of infection, which is serious enough by itself. After some weeks, when the bone sticks together quite well, remove your plate if you have used one, for it is then only a useless foreign body. If you have used transfixion pins at a distance, leave them in place until union is fairly solid.

Infection slows down union enormously; and you may have to wait for new bone to form from the periosteum if the exposed cortex becomes necrotic. It then constitutes a sequestrum, and will have to come away or be removed as in any case of infected bone.

In summary, union is hastened by good blood supply, good contact, active use when this does not interfere with fixation; it is slowed by poor blood supply, poor fixation in contact, and infection. And the most disastrous of these is infection.

712 Botetourt Street.

Public Health Statistics

I. C. RIGGIN, M. D.,
State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for April, 1940, compared with the same month in 1939, follows:

	1940	*1939*
Typhoid and Paratyphoid Fever	8	8
Diphtheria	47	62
Scarlet Fever	192	160
Measles	499	2,763
Meningitis	4	4
Poliomyelitis	1	3
Rocky Mountain Spotted Fever	0	0
Typhus Fever	0	0
Undulant Fever	0	2
Tularaemia	0	2

ANNUAL CONFERENCE OF STATE HEALTH WORKERS

The third annual conference of State health workers recently was held at the John Marshall Hotel in Richmond. Approximately 400 persons attended the two formal morning sessions including, in addition to the central office staff of the State Department of Health and representatives from Richmond health organizations, the health officers, sanitation personnel and nurses of the twenty-nine local health departments.

Governor James H. Price addressed the opening meeting; immediately after, brief talks were made by Dr. W. T. Graham, President of the State Board of Health, and Dr. I. C. Riggin, Commissioner of Health.

The sanitation of summer camps, representing a new duty imposed by law upon the State Department of Health, was considered in detail both at the general sessions and at the round-table conferences. The new premarital law also was featured at the formal and group meetings. Recent developments in Virginia maternal and infant program, collapse therapy in the State tuberculosis program, the relationship between county health departments and the State tuberculosis sanatoria, the sanitary significance of bacteriological reports on water samples, balancing the nurses' activities, problems in health education and suggestions for school health education also were considered.

PREVENTORIA IN THE CONTROL OF TUBERCULOSIS

Several years ago the National Tuberculosis Association stimulated the establishment of preventoria, open air classes and nutrition camps for children who were undersized and malnourished, because at that time such young people were considered to be pre-tuberculous. The Association's recent study and appraisal of these methods have found them ineffective in controlling tuberculosis in children and in preventing its development in later life.

A child apparently in good health with a positive tuberculin reaction whose chest X-ray reveals nothing abnormal does not need special care, nor is he capable of transmitting the disease to others. Freedom from repeated exposures to infection is the most important factor in preventing his future breakdown with pulmonary tuberculosis.

Many of our previous conceptions of underweight and malnutrition, and their relationship to tuberculosis, have been changed. No child, regardless of its nutritional state, would develop tuberculosis unless tubercle bacilli enter his body. Many children who suffer from the first infection type of tuberculosis are of normal weight and nutrition, according to our present standard of measurement.

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Crowded and bad living conditions which favor mass transmission of the tubercle bacilli from the sick to the well are more dangerous than poor nutrition in producing the high tuberculosis rate seen in the American Negro and in the low income groups. The most effective way of preventing tuberculosis is controlling the active or open case. This requires an intensive case-finding program.

The cost of preventorium care is approximately the same as sanatorium care. Benefits frequently are temporary. Individuals who return to their homes with no supervision soon slip back into habits which again produce malnourishment. It is estimated that 20 per cent of children in public schools are malnourished. Money is not available for group care of these children; if it were, it could be more advantageously spent on case-finding and care of the open active cases of tuberculosis to prevent such cases from infecting others with whom they come in contact.

Children showing evidence of clinical pulmonary tuberculosis of the adult type should have the same careful institutional and surgical treatment as adults.

Woman's Auxiliary to the Medical Society of Virginia

President—MRS. HENRY A. LATANE, Alexandria.
President-Elect—MRS. GRIFFIN HOLLAND, Eastville.
Recording Secretary—MRS. T. N. HUNNICUTT, Newport News.
Treasurer—MRS. REUBEN F. SIMMS, Richmond.
Parliamentarian—MRS. JOSEPH BEAR, Richmond.
Chairman, Press and Publicity—MRS. HENRY M. SNEAD, Petersburg.

The White Sulphur Springs Meeting.

DEAR AUXILIARY MEMBERS:

All of us cannot go to New York in June for the Annual Convention of the Woman's Auxiliary to the American Medical Association, but we do hope that you are trying to plan to go to the joint meeting of the Medical Society of Virginia and the West Virginia State Medical Association, White Sulphur Springs, W. Va., July 29-31, 1940.

All doctors' wives, whether Auxiliary members or not, are heartily invited to attend the general assemblies and participate in the social functions.

You are asked to register at the Woman's Auxiliary registration desk where programs and information will be available.

Your officers, their committees, and the managers of the Greenbrier Hotel are working to make the convention one of inspiration and pleasure.

The Greenbrier Hotel offers many attractions and special rates for the convention. Please write to Mr. George D. O'Brien, Assistant Manager, for information, and then make your reservations early.

We hope that you will join us there.

Sincerely,

THE COMMITTEE OF ARRANGEMENTS.

The Petersburg Medical Auxiliary

Was honored by a visit from the State President, Mrs. Henry A. Latane, at a luncheon meeting on April 30. She was guest of honor and speaker, bringing much inspiration and many helpful suggestions to the group. Another guest, Mrs. E. L. Flanagan, State Chairman of Public Relations, spoke on the work of her department. Mrs. W. B. McIlwaine, local president, presided and introduced the speakers.

Interesting reports were heard from Mrs. H. R. Schmidt, local chairman of Exhibits, and Mrs. Louis Kolipinski, chairman of the Jane Todd Crawford committee, who stated that a donation had been sent, as requested, for this memorial. Mrs. Claiborne Jones reported splendid work done by the Auxiliary in taking care of the booths in the business districts for the Cancer Control campaign. Mrs. H. M. Snead gave results from a very successful rummage sale recently sponsored by the Auxiliary.

The following new members, who have joined during this year, were welcomed: Mrs. H. R. Schmidt, Mrs. James L. Hamner, Mrs. Louis Kolipinski, and Mrs. Robert Allison.

MARTHA A. WRIGHT,
(MRS. FLETCHER J. WRIGHT, Jr.)
Chairman, Press and Publicity.

Truth About Medicine

In addition to the articles previously enumerated, the following have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association:

Abbott Laboratories.

Ampoules Ephedrine Sulfate-Abbott, 0.025 Gm. (⅜ grain), 1 cc.

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Ampoules Gold Sodium Thiosulfate-Abbott, 0.075 Gm.
E. R. Squibb & Sons.
Amniotin in Oil, 5,000 International Units.
Ephedrine Alkaloid-Squibb.
Ephedrine Compound Inhalant-Squibb.
Ephedrine Inhalant Plain-Squibb.
Ephedrine Sulfate-Squibb.
Capsules Ephedrine Sulfate-Squibb, ⅜ grain.
Capsules Ephedrine Sulfate-Squibb, ¾ grain.
Tablets Thiamin Chloride-Squibb, 10 mgms.
Tablets Thiamin Chloride-Squibb, 3 mgms.
Thiamin Chloride Solution 5 cc., 10 mgms.
Thiamin Chloride Solution 5 cc., 25 mgms.
Thiamin Chloride Solution 5 cc., 50 mgms.
Thiamin Chloride Solution, 10 cc., 10 mgms.

New and Nonofficial Remedies

The following products have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Nonofficial Remedies:

Capsules Estriol, 0.24 mg.—Each capsule contains estriol (New and Nonofficial Remedies, 1939, p. 348) 0.24 mg. diluted with milk sugar. Abbott Laboratories, North Chicago, Ill.

Ampoules Sodium Cacodylate-Upjohn, 0.05 Gm. (¾ grain), 1 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104), 0.05 Gm. (¾ grain). Upjohn Company, Kalamazoo, Mich.

Ampoules Sodium Cacodylate-Upjohn, 0.1 Gm. (1½ grains), 1 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104) 0.1 Gm. (1½ grains). Upjohn Company, Kalamazoo, Mich.

Ampoules Sodium Cacodylate-Upjohn, 0.2 Gm. (3 grains), 1 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104) 0.2 Gm. (3 grains). Upjohn Company, Kalamazoo, Mich.

Ampoules Sodium Cacodylate-Upjohn, 0.32 Gm. (5 grains), 1 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104) 0.32 Gm. (5 grains). Upjohn Company, Kalamazoo, Mich.

Ampoules Sodium Cacodylate-Upjohn, 0.45 Gm. (7 grains), 1 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104) 0.45 Gm. (7 grains). Upjohn Company, Kalamazoo, Mich.

Ampoules Sodium Cacodylate-Upjohn, 0.97 Gm. (15 grains), 2 cc.—Each ampoule contains sodium cacodylate (New and Nonofficial Remedies, 1939, p. 104) 0.97 Gm. (15 grains). Upjohn Company, Kalamazoo, Mich.

Ampules Pontocaine Hydrochloride "Niphanoid" for Spinal Anesthesia, 10 mg.—Ampules containing pontocaine hydrochloride (New and Nonofficial Remedies, 1939, p. 73) in finely divided and instantly soluble form. The trade term "Niphanoid" (from the Greek, "snow like") is applied to a manufacturing process which it is claimed makes the material more readily soluble. Winthrop Chemical Co., Inc., New York.

Ampules Pontocaine Hydrochloride "Niphanoid" for Spinal Anesthesia, 20 mg.—Ampules containing pontocaine hydrochloride (New and Nonofficial Remedies, 1939, p. 73) in finely divided and instantly soluble form. The trade term "Niphanoid" (from the Greew, "snow like") is applied to a manufacturing process which it is claimed makes the material more readily soluble. Winthrop Chemical Co., Inc., New York. (*J.A.M.A.*, April 20, 1940, p. 1,557.)

Propaganda for Reform

The Present Status of Therapy With Chorionic Gonadotropin.—The Council on Pharmacy and Chemistry reports that the gonadotropic substance from the urine of pregnancy has been available for clinical use for nine years. Although it was enthusiastically received by physicians and placed in extensive therapeutic use, there has always remained a certain amount of skepticism as to its value. In this report the Council summarizes the experiences with this substance in the clinic up to the present time with an evaluation of the results reported. Among the conditions for which chorionic gonadotropin is recommended are functional uterine bleeding, cryptorchidism, hypogenitalism, amenorrhea, oligomenorrhea and enuresis. In accordance with the more recent developments in this therapy the Council is unable to endorse many of these recommendations. The Council believes that such therapy is of definite value in functional cryptorchidism within certain limitations. Although a considerable amount of data has been published on the treatment of uterine bleeding, the Council considers this therapy still unproved. Such treatment of other ovarian disturbances appears practically of little value. Until further evidence will have been made available, the Council approves of this treatment for cryptorchidism but considers such therapy of functional uterine bleeding as still being in the experimental stage. Likewise the treatment of male hypogonadism is also considered experimental. The Council approves of no other indications for such therapy at the present time. (*J. A. M. A.*, February 10, 1940, p. 487.)

The Council on Pharmacy and Chemistry Completes Thirty-Five Years of Service.—Thirty-five years has passed since the Council on Pharmacy and Chemistry met at Pittsburgh to organize. Since that time its work as a standing committee of the Board of Trustees of the American Medical Association has been continuous. From the time of its organization the names of the members of the Council and their connections have been made known; members, with the exception of the executive secretary, serve without remuneration. The Council publishes its conclusions, whether they are for or against the acceptance of a drug. It issues reports to the medical profession on matters of materia medica. Products are admitted to the book New and Nonofficial Remedies according to a set of rules published for the information of physicians and manufacturers. Remuneration in any form is never accepted for the consideration of submitted preparations. The Council also publishes statements on the status of new drugs. In 1939 reports on the status of drugs included those on sulfapyridine, chorionic gonadotropin, vitamin K, testosterone propionate, the promiscuous use of barbital compounds, sobisminol mass

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and sobisminol solution, cyclopropane, vitamins, local anesthetics, dilantin sodium, picrotoxin and stilbestrol. The rules now governing the acceptance or rejection of remedies are practically the same as those adopted in 1905. The interpretation of the rules, however, has been amplified and clarified to meet new conditions. Now, in 1940, the situation as far as the consideration of drugs is concerned is vastly improved, owing largely to the efforts of the Council, with the militant aid of *The Journal*. Advertising claims employed by manufacturers of pharmaceuticals for products accepted by the Council have, in the main, attained standards of accurateness and truthfulness not found in any other field of marketing or in the entire medical world outside the United States. Those firms which have been following the leadership of the Council have already found that it is much easier to comply with the new Food, Drug and Cosmetic Act and the Wheeler-Lea Act in the case of their accepted medicaments than have some firms which have tried to ignore the Council by extolling nonaccepted preparations. (*J. A. M. A.*, February 10, 1940, p. 491.)

Book Announcements

New Books.

The following are recent acquisitions to the Library of the Medical College of Virginia and are available to our readers, the only cost being return postage:

Pohle, E. A.—Clinical roentgen therapy.
Pohle, E. A.—Theoretical principles of roentgen therapy.
Rawdon-Smith, A. F.—Theories of sensation.
Reed, C. I. *et al*—Vitamin D.
Ride, L.—Genetics and the clinician.
Rigler, L. G.—Outline of roentgen diagnosis.
Rogers, C. G.—Textbook of comparative physiology. 2nd ed.
Ross, J. M.—Post-mortem appearances.
Sappington, C. O.—Industrial health.
Scheinfeld, A.—You and heredity.
Schwartz & Tulipan—A textbook of occupational diseases of the skin.
Scott, H. H.—History of tropical medicine.
Scudder, J.—Shock.
Shohl, A. T.—Mineral metabolism.
Smith & Helwig—Liquor, the servant of man.
Stewart, G. R.—Doctor's oral.
Thewlis, M. W.—Preclinical medicine.
Thorndike, A., Jr.—Athletic injuries.
Tilney & Riley—Form and functions of the nervous system.
Trueta, J.—Treatment of war wounds and fractures.
Tucker, A.—Miss Susie Slagle's.
University of Wisconsin—A symposium on the blood and blood-forming organs.
University of Wisconsin—A symposium on cancer.
Vinson, P. P.—Diagnosis and treatment of the diseases of the esophagus.
Weinzyrl, J.—General hygiene and prevention of medicine.
Westmann, S. K.—Sport, physical training and womanhood.
Wiener, A. S.—Blood groups and blood transfusion.
Williams, J. F.—Hygiene and sanitation.
Yearbook of Medicine, 1939.

Functional Disorders of the Foot. Their Diagnosis and Treatment. By FRANK D. DICKSON, M.D., F.A.C.S., Orthopedic Surgeon, St. Luke's, Kansas City General, and Wheatley Hospitals, Kansas City, Missouri, and Providence Hospital, Kansas City, Kansas. And REX L. DIVELEY, A.B., M.D., F.A.C.S., Orthopedic Surgeon, St. Luke's, Kansas City General, Research, and Wheatley Hospitals, Kansas City, Missouri, and Providence Hospital, Kansas City, Kansas. J. B. Lippincott Company. Philadelphia. 1939. Octavo of x-305 pages. 202 Illustrations. Cloth. Price, $5.00.

The authors present a new book designed to explain the causes, symptoms and treatment of the common foot ailments. They clearly show how correctly designed footwear can induce a foot with anatomical defects to function to maximum advantage and how it can restore normal function to a foot whose function has been damaged by poor footwear or by abuse. The subject matter to a large extent, therefore, deals with flat feet and footwear. The authors labor slightly to suggest that some of the included subjects are functional ailments, but this stresses an excellent point and in no way detracts from the value of the book. All the common foot ailments are taken up in the book and the problem of shoe design is particularly well discussed. The book is somewhat voluminous for the subject matter covered, but this adds to the ease of understanding it and should make it more useful to those who do not have foot ailments constantly in mind. This book is to be highly recommended as a guide to anyone interested in becoming informed in the subject.

THOMAS BEATH, M.D.

Injection Treatment. Of Hernia, Hydrocele, Ganglion, Hemorrhoids, Prostate Gland, Angioma, Varicocele, Varicose Veins, Bursae, and Joints. By PENN RIDDLE, B.S., M.D., F.A.C.S., Assistant Professor of Clinical and Operative Surgery, Baylor University, College of Medicine; Director of the Varicose Vein Clinic, Parkland Hospital, Dallas, Texas. W. B. Saunders Company. Philadelphia. 1940. Octavo of ix-290 pages. With 153 Illustrations. Cloth.

The interesting subject of the injection treatment of hernia is not new but was practiced before the modern aseptic era of surgery. The aim of the injection method is the same as that of surgery, namely the repair of the defect by scar tissue. Best results are obtained from the injection of indirect hernias

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which are not too large; young individuals respond better than the senile. Other types of hernia can often be improved even though cure is not obtained. The injection method may be used on patients in whom a surgical repair would be contra-indicated. Of course such conditions as diabetes, hyperthyroidism should be controlled before beginning the injections.

Like surgery the use of the injection method requires judgment, detailed knowledge of the anatomy, skill and cleverness in the mechanical use of simple instruments. The injection of hernia today may be compared to the injection treatment of hemorrhoids twenty-five years ago; its indiscrimate use for all types of hernia will only serve to condemn the procedure. The careful selection of cases with close observation of contraindications will bring gratifying results. The contraindications are clearly set forth by Dr. Riddle. It is not supposed that the injection treatment will supplant surgery, but will prove an invaluable addition to our armamentarium. The chapters on varicose veins and hemorrhoids are thorough-going discussions of these more standardized procedures. The book is well written, easily read and above all is pervaded with common sense.

ROBERT V. TERRELL.

Tumors of the Hands and Feet. Edited by GEORGE T. PACK, B.S., M.D., F.A.C.S., Assistant Clinical Professor of Surgery, Yale University School of Medicine and Cornell University College of Medicine; Attending Surgeon, Memorial Hospital for Cancer and Allied Diseases. St. Louis. The C. V. Mosby Company. 1939. Octavo of 138 pages. Illustrated. Cloth. Price, $3.00.

The symposium which comprises the subject matter of this book originally appeared in the January, 1939, issue of *Surgery*. Carcinoma of the hands and feet, subungual melanoma, angiomatous tumors of the hands and feet, tumors of the synovia, tendons, and joint capsules of the hands and feet, tumors primary in the bones of the hands and feet are covered by various authors.

The introduction by Pack and the section on subungual melanoma by Pack and Adair form the outstanding chapters. Pack has outlined clearly the roentgen and radium technics used at the Memorial Hospital.

The book can be recommended highly as a reference especially for those associated with tumor clinics.

It is still questionable whether any literature is so important that it should deserve duplication on the shelves of all medical libraries. The material now can be found in the issue of *Surgery* as mentioned above.

F. B. M.

The Management of Obstetric Difficulties. By PAUL TITUS, M. D., Obstetrician and Gynecologist to the St. Margaret Memorial Hospital, Pittsburgh; Consulting Obstetrician and Gynecologist to the Pittsburgh City Homes and Hospital, Mayview and to The Homestead Hospital, Homestead, Pa.; Secretary of the American Board of Obstetrics and Gynecology. Second Edition. St. Louis. The C. V. Mosby Company. 1940. Octavo of xxiv-968 pages. Cloth. Price, $10.00.

In the preface of the second edition the author confesses a "distinct feeling of obligation toward the critics of the first edition, who in their reviews for the medical journals gave me many suggestions for practical and useful additions to the text." I had the pleasure of reviewing the first edition and I note that at least one of my suggestions was adopted, i.e., the treatment of breast abscess by aspiration and Bier's cups. I wish I could persuade the author to try extra-ovular bags in the treatment of placenta previa.

The second edition of this valuable book has been brought thoroughly up to date. The chapters on relief of sterility, the use of sulfanilamide in puerperal sepsis and pyelitis, and improvement in obstetric analgesia anesthesia are to be especially commended.

M. PIERCE RUCKER, M.D.

Directory of Medical Specialists. Certified by American Boards. 1939. PAUL TITUS, M. D., Directing Editor. J. STEWART RODMAN, Associate Director. Columbia University Press. New York. 1940. Pages xv-1573. Cloth. Price, $5.00.

To those who have pored over the American Medical Directory searching out specialists in some field, this book will be a boon, as it contains lists of the specialists. For example, the eye men are all sorted out by place of residence whether Alameda, California; Oshkosh, Wisconsin; Alaska; Hawaii; Canada; Brazil; China or Mexico—perhaps not all the eye men, but at least those who have been certified by the American Board of Ophthalmology. So for the other specialties, including one less well-known, the American Board of Anesthesiology.

In the back of the volume there is an alphabetical list of all the specialists. In glancing through the pages, two names of physicians have been noted that have already died and this fault will continue to get worse.

E. C. L. MILLER, M.D.

Virginia Medical Monthly

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Editorial

Experiments in Cooperative Medicine.

There have developed within recent years in the United States a great variety of methods for distributing medical service. Some are still in the making. Some have failed. Others give promise of succeeding. We have also the experience of foreign nations before us. In nearly every other country of the world there is some sort of voluntary or compulsory government controlled plan. Such plans have been developing for fifty years—in fact ever since Prince Bismarck introduced Compulsory Sickness Insurance in Germany in 1883. All these schemes are adapted to conditions peculiar to the countries in which they have arisen. Their mistakes serve as a warning to us. In this country—still free and democratic—conditions obtain which are entirely different from those that exist abroad. We are an enormous country composed of a variety of people whose customs, needs and aspirations are as dissimilar as the economic, social and geographical conditions that characterize them. Our rural and urban problems are different. Our eastern and western, northern and southern, problems are different. The indigent, marginal and low income groups present separate and distinct problems. Happily the way of experimentation in this country is still open and the opportunity of trying out many dissimilar plans still exists. It is fortunate too that Federal legislation has not yet closed these roads.

We are familiar with many of the plans for distributing medical service that are now on trial in this country. For instance: (1) There are about 300 *Group Practice Plans* in operation. The Mayo Clinic and the McGuire Clinic are examples of this type. (2) There are about 2,000 *Industrial Medical Care Plans* in operation. We have come to associate them quite naturally with the great industries. In our midst the Chesapeake and Potomac Telephone Company, the DuPont Company, the Virginia Electric and Power Company, the Chesapeake and Ohio Railroad, each has a plan and each plan has special features. (3) There are at least 300 *Student Health Services* in as many colleges and universities offering examinations, consultations, clinic and hospital care, and putting particular stress on health education. (4) There are *Rural Medical Care Plans* of two types. Under one a group of citizens by subsidies, bonuses, etc., guarantees a physician an annual income sufficient to attract him to the community. Under the other the Farm Security Administration by loans enables farmers to pay for medical service on a reduced fee basis. (5) There are about 200 *State and County Medical Society Plans* which provide for (a) the indigent on a low fee schedule and (b) for the low income group either on a prepayment or a postpayment basis. (6) There are *Group Hospitalization Plans* by the hundred, with nearly 5 million subscribers all over the country. (7) There

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are 500 and odd *Hospital Insurance Companies* offering policies with cash benefits for sickness and hospital service. (8) There are about nineteen *Flat Rate Plans* offered by certain hospitals for specifically designated services. A hospital, for example, may offer to care for obstetrical patients at a flat rate of $50. (9) There are about 500 *Medical and Hospital Benefit Organizations* which operate hospitals and employ physicians on a contract basis to accommodate their members. Expenses are paid out of a fund accumulated from the sale of membership certificates or contracts. (10) Finally there are about two dozen *Union Sick Benefit Funds and Fraternal Plans* operating somewhat as the mutual benefit associations do. Such "lodge practice" plans offer members medical service, and cash benefits help to defray hospital and doctors bills.

The plan we are discussing—cooperative medicine—is then just one of many plans. It is an outgrowth of the fundamental idea underlying the whole cooperative movement, a movement that is, as we know it today, more than a century old and world-wide in its operation, a movement that seeks a solution of the industrial problem by merging the producer-consumer interest, that relates the home to the work-shop and is designed to turn economic surplus to human need.

Cooperative medicine is described as a voluntary non-political organization of patients into groups of consumers. In practice, a group, say of 1,000 families, forms an association for the purpose of owning and operating a hospital with its diagnostic and therapeutic equipment and of hiring a staff of physicians. Such an organization is run by a Board of Trustees elected by the membership at large. Such an organization is supported by a fund created from the annual contributions of the members. Membership entitles the family and its dependents to full medical and hospital service, the completeness of which is determined by the size of dues paid.

The advocates of this method of distributing medical service maintain that it answers most of the criticisms directed at our present system, that it takes the competitive feature out of the practice of medicine and is a stop gap to state medicine. They claim that it offers a complete medical service at moderate cost to the low income group and the services of a group of specialists otherwise inaccessible to this group. It is said to promote health mindedness and to spare doctors the business details that afflict them in private practice. While decrying the A. M. A. in one breath the proponents feel it important to maintain in the next that their associations conform to the famous ten principles laid down by the A. M. A. in 1934 and reaffirmed in 1937.

The A. M. A. is opposed to most cooperative health associations on the following grounds:

(1) They violate the principle that the patient must have a free choice of doctors.

(2) They are corporations practicing medicine.

(3) They represent contract practice in its worst form.

(4) Cooperative Health Associations, by advertising and soliciting patients, offend the sensibilities of a profession which abhors such practice.

(5) They should come under the Insurance and not under the Cooperative laws.

The A. M. A. maintains that many of the benefit organizations are wholesale buying clubs organized to induce physicians to provide services at a 50 per cent discount. Others are described as cut-rate clinics.

There are said to be many cooperatives organizing health associations in the United States. We do not know just how many there are. There is for example the cooperative Community Hospital of Elk City, Oklahoma, the organization and operation of which is described by its medical director, Dr. M. Shadid, in a recent brochure entitled *Principles of Cooperative Medicine.* There is the Health Association of Greenbelt, Maryland, the Wage Earners Health Association of St. Louis, Missouri, the Beneficial Society of San Diego, California, the Cooperative Health Society of Milwaukee, and the Cooperative Health Association of Ann Arbor, Michigan.

The most famous, however, is *Group Health Association, Inc.* of Washington, D. C., organized November 1, 1937. It is a cooperative organization of men and women in the Executive Branch of the United States Government. Its 2,500 members are selected only after physical examinations show them to be physically normal persons. An application fee of $5.00 for the member and $1.00 for each dependent is followed by another fee of $10.00 and $1.00, if accepted, and thereafter a monthly fee of $2.20 for members plus $1.80 for wife plus $1.00 for each child. In addition $1.00 is charged for the first home visit and a $25.00 hospital fee is added in cases of pregnancy. On the whole a rather complete medical and hospital service is offered. Hospitalization

is limited to twenty-one days for any one illness, with a maximum of forty-two days per year. The doctors on the staff receive from $3,600 to $7,200 a year and are licensed by the Board of Licensure of the District of Columbia. The staff consists of ten doctors, seven nurses, three technicians and two pharmacists. Both the District Courts and the Court of Appeals have declared it legal.

This association has been bitterly opposed by both the A. M. A. and the Medical Society of the District of Columbia. Doctors on the staff have been fired from the medical society and refused privileges in local hospitals. Over it a legal fight has been waged in Congress. The grounds for opposition to it are those we have just enumerated in stating the position of the A. M. A. in regard to most cooperatives.

Cooperative medicine appears to flourish best in a homogeneous population, among groups socially, economically and geographically akin.

One cannot help admiring the independence and aggressiveness of honest cooperatives. As one of the historians of this movement has declared: Whether it "can lead a stubborn world decisively along this cooperative road probably will depend more not only on its numbers, but also on its power to enlist intelligence and develop in all ranks a leadership capable of creating enthusiasm and producing every day conviction among the masses of mankind."

Proceedings of Societies

The Mid-Tidewater Medical Society

Met at Gloucester for its regular quarterly meeting on April 23, with Dr. W. P. Jones of Urbanna presiding. Dr. M. H. Harris of West Point was at the secretary's desk. At the business session, delegates and alternates were appointed for the meeting of the State Society at White Sulphur Springs; Drs. E. L. W. Ferry and M. H. Harris were appointed a committee to draw up resolutions to Dr. Thomas B. Latane who has retired from practice; and several other matters of interest were discussed. One of these was the adoption of a resolution to the effect that members of the Mid-Tidewater Society should charge insurance companies a minimum fee of three dollars for all medical examinations of persons applying for policies below $1,000 and a five dollar fee for policies over that amount. A delicious luncheon was served the members and guests at the Presbyterian Church.

At the scientific session, there was a symposium on gastro-intestinal disturbances and indigestion, led by Dr. C. M. Caravati of Richmond. Other Richmond doctors taking part were: Dr. R. D. Bates, Jr., who spoke on Laboratory Aids to Diagnosis; Dr. D. D. Talley on X-ray Diagnosis; Dr. W. L. Nalls on Chest Conditions Giving Symptoms of Indigestion. Drs. F. S. Johns and J. M. Hutcheson, also of Richmond, and a number of the Society members discussed the subject.

The Augusta County Medical Society

Held its regular quarterly meeting at the Stonewall Jackson Hotel, Staunton, on May 1, at which time delegates were elected to the meeting of the State Society at White Sulphur Springs. The Society voted to contribute to the National Physicians' Committee for the Extension of Medical Service in their fight against propaganda directed at organized medicine. Dr. F. P. Floyd of Waynesboro was elected to membership.

The scientific portion of the program consisted of a paper by Dr. J. M. Emmett of Clifton Forge on "Various Operative Procedures for Correction of Gastric Ulcer and Gastric Carcinoma", and one by Dr. W. P. Gilmer, also of Clifton Forge, on "The X-ray Examination of the Stomach".

Drs. D. E. Watkins and Joseph E. Cox, both of Waynesboro, are president and secretary of this Society, respectively.

Norfolk County Medical Society.

At the annual meeting of this Society on May 6, delegates and alternates were named to the annual meeting of the State Society. Dr. James W. Anderson, president-elect, will succeed to the presidency at the September meeting, and Dr. Lockburn B. Scott will resume his duties as secretary-treasurer. Dr. Scott has been president of the Society since the death of Dr. D. Lee Hirschler, with Dr. A. Brownley Hodges as secretary.

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Lynchburg Academy of Medicine.

The regular monthly meeting of the Academy was held May 6, at the Lynchburg General Hospital.

Cooperating with the Lynchburg General Hospital only a business meeting was held, the scientific part of the program being held jointly May 21, with the Lynchburg General Hospital, Dr. W. C. Davison from Duke being the guest speaker.

Delegates and alternates were elected for the State Convention.

Due to the increased activities of the various healing cults in our State Legislation, Dr. John Hundley, Jr., felt the following resolution very imperative:

BE IT RESOLVED that the Lynchburg Academy of Medicine, Inc., in regular meeting May 6, 1940, hereby petition the House of Delegates of the Medical Society of Virginia to institute proceedings directed toward the more stringent enforcement of the laws regulating the illegal and irregular practice of the healing arts in Virginia.

BE IT FURTHER REQUESTED that a fund be created for the prosecution of illegal practitioners either through assessment of the members of the Medical Society of Virginia or by raising the dues, and that efforts be made to educate the legislators of the State in a true appreciation of the dangers resulting from cult practice.

The resolution was unanimously adopted by the Academy.

C. E. KEEFER, M.D.,
Secretary-Treasurer.

Roanoke Academy of Medicine.

At the meeting of the Academy on May 6, the following officers and committeemen were chosen, all of whom will take office on October 1: President, Dr. Kenneth D. Graves; vice-presidents, Drs. David B. Stuart and Mortimer Williams; secretary-treasurer, Dr. Allen Barker; executive committee, Dr. L. G. Richards, chairman, Drs. G. M. Maxwell, J. C. Darden, W. P. Jackson and Henry Lee; and judiciary committee, Drs. J. W. Preston, E. G. Gill, C. T. Burton, J. L. Kinzie, and Rees Morgan. Delegates and alternates to the State meeting were also elected.

The Virginia Society of Ophthalmology and Otolaryngology

Held its annual meeting at the Chamberlin Hotel, Old Point Comfort, on May 18, under the presidency of Dr. Karl Blackwell of Richmond. Guest speakers were: Dr. Lyman G. Richards, Boston, Mass., who spoke on "Diagnosis and Treatment of Sinus Disease in Children"; and Dr. F. B. Walsh, Johns Hopkins University, Baltimore, on "Ocular Signs of Thrombosis of the Dural Sinuses". Members who presented papers were: Dr. Frank P. Smart, Norfolk; Drs. F. D. Woodward and V. W. Archer, University of Virginia; Dr. H. Grant Preston, Harrisonburg; Dr. Thomas E. Hughes, Richmond; and Dr. Robert Courtney, Richmond.

Officers elected are: president, Dr. Geo. G. Hankins, Newport News; vice-president, Dr. Mortimer H. Williams, Roanoke; and secretary-treasurer, Dr. Guy Fisher, Staunton. The next convention will be held in Richmond in 1941.

The Virginia Peninsula Academy of Medicine

Held its March meeting at Langley Field, under the auspices of the doctors of the Post. Lieutenant Colonel J. I. Sloat of the Walter Reed Hospital, Washington, spoke on "Treatment of Fractures of the Leg".

The April meeting was held at the James River Country Club and the address was given by Dr. James Smith of McGuire Clinic, Richmond, his subject being "Treatment of Disorders of the Thyroid Gland".

Dr. A. A. Creecy and Dr. E. B. Mewborne, both of Newport News, are president and secretary, respectively.

News Notes

The Virginia-West Virginia Meeting.

Plans are shaping up for a fine meeting at the Greenbrier Hotel, White Sulphur Springs, W. Va., July 29, 30 and 31, and a large attendance is expected. The two associations will meet jointly for scientific meetings and for pleasures but the business sessions will be held simultaneously in separate groups.

Scientific sessions will be somewhat in the nature of a postgraduate course with out-of-state speakers. In addition to the orations on medicine and surgery, there will be three guest speakers each morning,

all outstanding in their specialties. Names of all guests were published in the March MONTHLY. A doctor from each of the states has been selected to discuss the papers presented. In the afternoons, the guest speakers of the morning will conduct round tables and these will be open to the full membership of the two associations. There will be excellent scientific and commercial exhibits which will add much to the interest of the meeting.

The first meeting of the House of Delegates will be held on Monday afternoon, July 29, from 4:30 to 6:30, the hour for the Tuesday meeting to be named at this time. The Council will, of course, meet prior to the House of Delegates. All component societies are urged to have representation at the business sessions.

As would be expected at a place like the Greenbrier Hotel, golf and tennis will have a place at this convention, a golf tournament having been planned for Sunday afternoon, July 28. All players will be expected to bring their handicaps, properly certified by their clubs. Attractive prizes are being planned for this as also for the tennis matches. In Virginia, golfers should advise Dr. J. M. Emmett of Clifton Forge, as promptly as possible of their intention to be in the tournament, and tennis players should communicate with Dr. W. A. McGee, 1601 Monument Avenue, Richmond. West Virginia has chairmen for these features also. Those interested in other forms of entertainment will find something to their liking.

Alumni and special societies and sections are planning get-togethers. Watch for the program in the July issue of your state journal for further information. This will be an occasion of unusual interest, so mark the dates on your calendar to be at the White Sulphur meeting.

American Medical Association.

Everything is in readiness for the opening of the New York meeting of the A. M. A. on June 10, and then follow five days which will be replete with meetings, pleasures, alumni and fraternity get-togethers, sight-seeing trips and everything to add to the interest and entertainment of those who attend. An interesting feature of the opening general meeting on Tuesday evening is that the music will be furnished by the Doctors' Orchestral Society of New York.

As only fellows of the A. M. A. may register and take part in the work of the sections, it is recommended that members of the State Association who expect to be in New York at that time but are not fellows should at once apply for fellowship.

Married.

Dr. Stuart N. Michaux of Richmond and Mrs. Ruth Ann Wolfe Benjamin of New York, April 27.

Dr. John Tallman Jarrett, of the Resident Staff of the Medical College of Virginia Hospitals, and Miss Anne Mildred Wood of Richmond, May 1.

Dr. James Levi Thomson and Miss Dorothy Mae Knowles of Richmond, May 15. Dr. Thomson is on the Neurological Service of the Medical College of Virginia Hospitals.

New Fellows of American College of Physicians.

At the annual session of the College in Cleveland in April, the following Virginia doctors were among those inducted into fellowship:

Dr. Walter Paul Adams, Norfolk

Dr. Andrew DeJarnette Hart, Jr., University

Dr. Burbridge Scott Yancey, Harrisonburg

It is noted that there were in attendance physicians from forty-seven states, Hawaii, Puerto Rico, Mexico, and eight provinces of Canada. The registrants were from 476 different communities.

Dr. R. L. Phipps

Of Clintwood was recently elected vice-president of the Cumberland Bank and Trust Company of that place.

Dr. J. H. Hagy,

Of Imboden, has been elected a delegate from Wise County to the republican national convention.

Jefferson Hospital Staff.

At a dinner meeting of the staff of the Jefferson Hospital, Roanoke, on May 22, Dr. Waltman Walters spoke on Unusual Lesions of the Biliary Tract, and Dr. Charles W. Mayo on Malignant Diseases of the Right Colon. Both speakers are from Rochester, Minn.

The staff of this hospital has regular meetings every Wednesday night and, at the end of the season, they usually have two distinguished guest speakers. There were about 217 men present at the dinner on the 22nd.

Dr. and Mrs. William Lett Harris,

Norfolk, will spend July and August at Courtney Terrace, Virginia Beach, as has been their custom for some years.

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The Holland-Rantos Company, Inc.,

Makers of Koromex products, has moved its executive offices to 551 Fifth Avenue, New York City.

Dr. P. G. Hamlin

Recently connected with the Eastern Shore State Hospital at Cambridge, Md., has returned to Virginia and has assumed duties as Clinical Director of the Eastern State Hospital at Williamsburg.

Medical College of Virginia News.

Commencement exercises closing the one hundredth second session of the Medical College of Virginia, Richmond, will be held June 4.

There are one hundred thirty-seven candidates for graduation: sixty-eight in medicine, twenty-six in dentistry, thirteen in pharmacy, and thirty in nursing.

Dr. Stuart Leslie Craig, an alumnus of the college, surgeon and a director of the New York Eye and Ear Infirmary New York City, will be awarded the honorary degree of doctor of science at the graduation exercises.

Dr. Reginald Fitz, lecturer on the history of medicine, The Harvard Medical School, will be the commencement speaker.

The commencement sermon will be given by Dr. Theodore Adams, pastor of the First Baptist Church, Richmond.

University of Virginia Medical School News.

A Postgraduate Clinic for the Traveling Unit of the West Virginia Obstetrical and Gynecological Society was held at the University of Virginia on April 15. The following program was presented: Postpartum Sterilization by Dr. W. N. Thornton, Jr.; Ward Rounds conducted by Dr. John M. Nokes; Demonstrations of Embryological and Teratological Materials by Drs. H. E. Jordan and J. E. Kindred; Demonstrations and Discussion of Chorionic Tumors by Drs. J. R. Cash and T. J. Williams; Dr. W. W. Waddell, Jr. spoke on the subject, Vitamin K in the Newborn; Drs. E. P. Lehman and Floyd Boys discussed Prevention of Abdominal Adhesions; and a Symposium on Hypertension was conducted by Drs. Alfred Chanutin, E. M. Landis and J. Edwin Wood, Jr.

On April 18, Dr. H. B. Mulholland spoke before the Staff of the Elizabeth Buxton Hospital in Newport News on the subject, Clinical Acidosis, Alkalosis and Dehydration.

On April 25, Dr. S. D. Blackford participated in the Postgraduate Course in Medicine and Surgery for the Warwick County Medical Society conducted under the auspices of the Department of Clinical and Medical Education of the Medical Society of Virginia. His subject was Management of Gall-bladder Disease.

Dr. C. Malone Stroud of St. Louis, Missouri addressed the University of Virginia Medical Society on April 26. His subject was Skin Allergy and Eczema.

Dr. R. B. Bean attended the meetings of the American Association of Physical Anthropologists in New York City from May 2 to 4 and presented a paper on The Peopling of Virginia.

Drs. E. P. Lehman and Floyd Boys read a paper on Heparin in the Prevention of Peritoneal Adhesions with Report of Progress before the American Surgical Society, meeting in St. Louis on May 2.

Dr. J. A. Kennedy, Professor of Bacteriology at the University of Louisville School of Medicine, visited the Medical School on May 4.

At the meeting of the Greenville County Medical Society in Greenville, South Carolina on May 13, Dr. Eugene M. Landis spoke on the Pathogenesis and Treatment of Edema and Dr. Staige D. Blackford discussed Spontaneous Pneumothorax.

At the meeting of the University of Virginia Medical Society on May 13, Dr. W. W. Waddell, Jr. discussed Further Observations on Vitamin K in the Newborn.

On May 16, Dr. Oscar Swineford, Jr. addressed the Fauquier Medical Society on the subject, Chronic Rheumatism.

News from Duke University School of Medicine.

On April 26, Dr. Edward A. Schuman, Professor of Obstetrics, University of Pennsylvania School of Medicine, lectured on "Puerperal Infection".

At the monthly meeting of the Duke University Medical Society, May 9, Dr. Thomas Addis, Professor of Medicine, Stanford University School of Medicine, lectured on the "Treatment of Glomerular Nephritis".

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Certified by American Board of Internal Medicine.

Dr. Edward A. Delarue, Jr., and Dr. Walter Lewis Nalls, both of Richmond, were recently certified by the American Board of Internal Medicine as specialists in that field.

American Academy of Physical Medicine.

At the annual meeting held in Richmond, April 24-26, the following officers were elected: President, Dr. Harold D. Corbusier, Plainfield, N. J.; vice-presidents, Dr. G. J. P. Barger, Washington, D. C., and Dr. Thomas Wheeldon, Richmond, Va.; and secretary-treasurer, Dr. Herman Osgood, Boston, Mass. The next meeting of the Academy will be held in New York.

Dr. Joseph H. Low,

Recently of King George, is now associated with the Yakima Clinic of Yakima, Washington, where he is practicing internal medicine.

Pan-American Congress of Ophthalmology.

Plans for this congress to be held in Cleveland, October 11-12, have been announced. It will be sponsored by the American Academy of Ophthalmology and Otolaryngology, which will hold its annual convention immediately preceding the Pan-American gathering.

The congress is open to any ophthalmologist who wishes to register. Non-members of the Academy may register regardless of attendance at the Academy meeting proper.

For further information, write Dr. William P. Wherry, executive secretary, American Academy of Ophthalmology and Otolarnygology, 1500 Medical Arts Bldg., Omaha, Neb.

Dr. Thomas Wheeldon,

Richmond, read a paper before the meeting of the Pan-American Medical Association in Washington, on May 5. The title of this paper was "The United States of the Cerebral Palsies".

Osler Memorial to be Dedicated.

The old autopsy house where Osler worked at Blockley has been restored as the Osler Memorial Building and will be dedicated on the grounds of the Philadelphia General Hospital, Philadelphia, on June 8. Original furnishings, including the necropsy table, have been collected, and the painting by Dean Cornwell, N. A., of New York, entitled "Osler at Old Blockley" will also be on exhibition. There are facilities in the building for housing and preserving relics of old Blockley, as well as Osleriana, and the Committee would welcome additions to this collection.

A cordial invitation is extended to those who are interested and especially those who are attending the A. M. A. Convention in New York City.

Dr. George H. H. Garrison,

Recently of Norfolk, left on June 1 to assume advanced residencies in obstetrics and gynecology at the Cooper Hospital, Camden, N. J.

Diseases of the Nervous System.

Under the editorship of Dr. Titus H. Harris, Galveston, Texas, made its first appearance in January of this year. The office of publication is at El Paso, Texas, and Murray Kornfeld is the Managing Editor. The purpose of the monthly publication is to place before practitioners in medicine in easily understandable, non-technical language, literature descriptive of mental and nervous conditions. The publication comes in response to the feeling of the editors that knowledge of nervous and mental affections is not diffused amongst general practitioners because most psychiatrists and neurologists express themselves in language so technical that the family physician will not struggle with it. There may be no valid reason why the truths of psychiatric and neurological medicine cannot be stated in simple, non-technical language.

Among the associate editors are: Dr. Franklin G. Ebaugh, Denver; Dr. I. M. Epstein, El Paso; Dr. Temple Fay, Philadelphia; Dr. Walter Freeman, Washington, D. C.; Dr. Jas. K. Hall, Richmond; Dr. A. Hauser, Houston; Dr. Frank H. Luton, Nashville; Dr. Karl A. Menninger, Topeka; Dr. Adolf Meyer, Baltimore; Dr. Theodore A. Watters, New Orleans; Dr. Wm. Walter Young, Atlanta.

In the May issue of the Journal Dr. J. K. Hall of Richmond writes about "The Language-Barrier in Depressed States", and in the June issue will appear "Emotional Illness" by Dr. Beverley R. Tucker also of Richmond.

Stop, Doctor!

Have you looked over the advertisements in this issue of the MONTHLY? If not, please do it now. Advertisers, same as individuals, like attention. They also make it possible for you to have your

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own State journal. Coupons sent them from YOUR journal —the MONTHLY—show your interest. When there are not coupons, ask the advertisers about products in which you are interested. It will help you, the advertiser, and the MONTHLY.

Officers of Harvard Club.

Dr. Warren T. Vaughan, Richmond, was recently elected president of the Harvard Club of Virginia, and Dr. Thomas Wheeldon, Richmond, was made a member of the executive committee.

The Spring Graduate Course of Gill Memorial Hospital

Was held for the fourteenth time in Roanoke, during April. This was attended by sixty-five physicians from twenty states. The following doctors appeared on the program:

Dr. Karl S. Blackwell, Richmond
Dr. Grady Clay, Atlanta
Dr. C. C. Coleman, Richmond
Dr. Parker Heath, Detroit
Dr. H. S. Hedges, Charlottesville
Dr. Wendell L. Hughes, Hempstead, L. I.
Dr. Chevalier L. Jackson, Philadelphia
Dr. Peter C. Kronfeld, Chicago
Dr. Dean M. Lierle, Iowa City
Dr. Lyman Richards, Boston
Dr. Wm. Rienhoff, Jr., Baltimore
Dr. Harry R. Slack, Jr., Baltimore
Dr. C. R. Straatsma, New York
Dr. D. Blair Sulouff, New York
Dr. Frank B. Walsh, Baltimore

The fifteenth Annual Spring Graduate Course will be held the first week in April, 1941.

Dr. Allen S. Lloyd,

For several years located in Norfolk, has moved to Los Angeles, Calif., where he is engaged in the practice of orthopedic surgery in connection with the Ross-Loos Medical Group.

Dr. Lockburn B. Scott,

Norfolk, leaves on June 5 for Winnipeg, Manitoba, for a visit to his daughters and will return home about September 20.

Dr. J. E. Haynsworth,

Formerly of Buckingham, who has been taking graduate work in Philadelphia for the past year, has returned to Virginia and is now connected with the Chesapeake and Ohio Hospital at Clifton Forge.

Winchester Memorial Hospital.

At the annual session of the Board of Directors of this hospital, Dr. Hunter H. McGuire was re-elected president and Dr. James A. Miller secretary.

It was announced that an addition to the nurses' home had been made possible through a gift and building operations are already under way. Legacies amounting to almost $50,000 had been received and would be used for needy patients and the construction of an addition to the main plant.

Dr. A. Tyree Finch

Has been appointed health officer of Chase City.

Dr. R. S. Montgomery

Was recently elected president of the South Hill Rotary Club.

Physician Wanted

In Rockingham County. Good location for single man between twenty-five and forty-five years of age. Information in regard to this location may be obtained from Miss Sarah E. Halterman, R. N., Bergton, Va. (*Adv.*)

For Sale—

Wappler Vertex X-ray Machine with Wappler Tilt Top Fluoroscopic Table; one Radiator type tube, thirty milli; one Universal type tube; one Brady Potter Bucky, ninety K. V-P., eight-inch spark gap, fifty to sixty milli. For price and further information, apply to No. 175, care this JOURNAL. (*Adv.*)

Obituary Record

Dr. Robert Lee Page,

Prominent physician of Albemarle County, died at his home near Batesville, on April 29. He was seventy-seven years of age and a graduate of the Bellevue Hospital Medical College, New York, in 1884. Dr. Page had practiced in Batesville for fifty-two years. He was a former president of the Albemarle County Medical Society and a member of several other medical organizations. He was very active in Masonic work and was a member of the working committee of the Grand Lodge of Masons in Virginia. Dr. Page had been an active member of the Medical Society of Virginia since 1885, and at one time served as a member of its Council. His wife and three children survive him. One son is Dr. Robert Massie Page of Washington, D. C.

At a recent meeting the Albemarle County Medical Society adopted the following appreciation:

Dr. Robert L. Page died at his home, "Castle Brook Farm", at Batesville, Virginia. He was born on the ancestral estate at Batesville, May 8, 1863. Dr. Page was a graduate in Medicine and Surgery from Bellevue Medical College in 1884. He had practiced his profession in Albemarle County since 1888. Since 1918 he had served as physician at Miller School. Besides being a prominent physician, he was a leading resident of the County, a faithful Mason, and an extensive land owner and orchardist.

At a meeting of the Albemarle County Medical Society, the following resolutions were adopted:

WHEREAS, our Heavenly Father, in His divine providence, has seen fit to take from our midst one of our colleagues, Dr. Robert L. Page, of Batesville, Albemarle County, Virginia;

WHEREAS, he has been a loyal and faithful member of the Albemarle County Medical Society for a number of years, during which time he enjoyed the confidence and esteem of the entire profession;

WHEREAS, his Christian character and beneficent influence endeared him to a large clientele; his friendships were strong and lasting, and in any cause which he deemed worthy he was a tower of strength; he was a gentleman endowed with very precious gifts of mind and character to serve as a beacon light for us to follow to the port of peace and safety, "a sheltering rock in a weary land";

RESOLVED, that we, members of the Albemarle County Medical Society, do hereby express our deep sorrow at the loss of such a physician and so valuable a friend, and wish to express our sincere sympathy to his family and relatives; and that a copy of these resolutions be placed on the minute book of the Albemarle County Medical Society, in the VIRGINIA MEDICAL MONTHLY, and be sent to his family.

H. S. HEDGES
PERCY HARRIS
M. L. REA
Committee.

Dr. Thomas Melville Talbott,

Probably the oldest practicing physician of the State, died at his home in East Falls Church, May 10, at the age of ninety-one. Death was due to pneumonia following a fall ten days previously. He was a graduate in medicine from the University of Maryland in 1870. Dr. Talbott had practiced at East Falls Church for sixty-eight years and is credited with having delivered more than two thousand present and former residents of Fairfax and Arlington Counties. He liked to term himself as a "horse and buggy" doctor, although he bought one of the first automobiles owned in his section. Dr. Talbott also introduced the first telephone to Falls Church in 1880, it being a single line hook-up between his house and the village store, two miles away, the idea being to save his patients the walk.

Dr. Talbott joined the Medical Society of Virginia in 1891 and had been an interested member since that time.

His wife, two sons and a daughter survive him.

Dr. James Wilson Hunter, Jr.,

Prominent X-ray specialist of Norfolk, died at Hot Springs, Ark., May 11, having been in ill health for some time. He was sixty-two years of age and a graduate in medicine from the University of Virginia in 1901. Dr. Hunter was a former president of the Norfolk County Medical Society and had been a member of the Medical Society of Virginia for thirty-eight years. His mother and two sisters survive him.

The following resolutions were adopted by the Norfolk County Medical Society:

WHEREAS Providence has seen fit to take from us a most beloved and loyal member and former President of this Society, Dr. James Wilson Hunter, Jr., in his 62nd year of age—

Dr. Hunter died at Hot Springs, Ark., May 11, after a period of failing health.

He was a native of Norfolk and received his early education here under private tutorship and graduated from Episcopal High School at Alexandria, Virginia.

He received his Master of Arts degree and Doctor of Medicine degree at the University of Virginia.

He early interested himself in X-ray work and became the pioneer Radiologist of this section, which specialty he followed until his retirement at the close of last year.

He was author of numerous articles in Radiology. He was a member of the American College of Physicians, the American College of Radiology, the American Association for the Advancement of Science, the American Medical Association, the Seaboard Medical Association, the Society of the Sons of Cincinnati, the Alpha Omega Alpha Fraternity, the Huguenot Society of America and a veteran of the World War, a Captain in the Medical Corps.

Friendly, affable and courteous, he exemplified the principles of honor and gentility.

AND WHEREAS we feel this Society has lost a most valued member, BE IT RESOLVED that this token of our esteem (1) be spread upon the minutes of this Society; (2) A copy be sent the JOURNAL of the Medical Society of Virginia; (3) A copy be sent the members of his family.

H. W. PHILLIPS
N. G. WILSON
J. WARREN WHITE

Dr. Donald MacKenzie Faulkner,

Well-known orthopedic surgeon of Richmond, died May 6. He was a native of Mecklenburg County and forty-seven years of age. Dr. Faulkner gradu-

ated in medicine from the University of Virginia in 1918, locating in Richmond in 1923. He was associate professor of orthopedic surgery at the Medical College of Virginia and a member of the staff of the Crippled Children's Hospital. Dr. Faulkner was a member of several fraternal and medical organizations and joined the Medical Society of Virginia in 1924. His wife and three children survive him.

Dr. James Morrison,

Lynchburg, died May 15, after a brief illness. He was born in Lexington in 1871 and received his medical degree from the University of Virginia in 1898. Dr. Morrison had been a member of the Medical Society of Virginia since 1901. His son, Dr. Frederick Morrison, was associated with him in practice.

Resolutions on Dr. Hirschler.

Dr. D. Lee Hirschler was born in Norfolk, August 20, 1880, and received his early education at the old Norfolk Academy. He graduated from the University of Virginia Medical School in 1901. After an internship in Mt. Sinai Hospital in New York, and postgraduate study in Europe, he returned to his native city for the practice of his profession.

Dr. Hirschler was a Lieutenant Commander in the Medical Corp, Special Unit, United States Naval Reserve. He was on the Staff of the Norfolk General Hospital, the Florence Crittenton Home, and the King's Daughters' Clinic.

He was a member of the American Medical Association, the American Urological Association, the Baltimore-Washington Dermatological Society, the Medical Society of Virginia, and was President of the Norfolk County Medical Society at the time of his death, March 22, 1940, having been an active member of this Society for more than thirty years.

Dr. Hirschler was a valuable friend and a skillful practitioner of the highest integrity. The community and the profession suffered a distinct loss in the passing of this beloved physician.

WHEREFORE, BE IT RESOLVED that a copy of these resolutions be recorded in the annals of the Norfolk County Medical Society, and that a copy be sent to the bereaved family, and one to the VIRGINIA MEDICAL MONTHLY.

C. J. DEVINE
LOMAX GWATHMEY
N. G. WILSON

Resolutions on Death of Dr. Geisinger.

BE IT RESOLVED by the Board of Directors of the Richmond Hospital Service Association that, with the deepest regret, it records the death of Joseph F. Geisinger, to whom the Association primarily owes it conception, its origin, its final organization, its broad basis of fullest public service combined with sound financial conduct; and to whom this Association is additionally indebted for his constant devotion as a charter member of the membership group, as an original and continuing director, and as an efficient and effective chairman of several of its most important committees;

AND BE IT FURTHER RESOLVED that this Board deplores the untimely death of Joseph F. Geisinger, who, as chairman of the Medical Service Committee, had brilliantly conceived a program that would bring untold benefit to thousands of Richmond's citizens through placing the cost of adequate individual medical care upon a sound and bearable basis, and whose loss will delay the fulfillment of the program;

AND BE IT FURTHER RESOLVED that each member of the Board of Directors of the Richmond Hospital Service Association deeply feels the personal loss of Joseph F. Geisinger, a lovable friend, an inspiring comrade, a citizen devoted to public good, and a surgeon of great ability and of the highest ideals;

AND BE IT FURTHER RESOLVED that these resolutions be spread upon the permanent minutes of this Board and that a copy of these resolutions be sent to his bereaved family with expressions of deepest sympathy; a copy be sent to the Richmond Academy of Medicine, to the Virginia Medical Society, and to Stuart Circle Hospital.

BY ORDER OF THE BOARD OF DIRECTORS,
RICHMOND HOSPITAL SERVICE ASSOCIATION.
M. HASKINS COLEMAN, JR.,
Secretary of the Board.

Dr. Robert Rolen Preston,

Glade Spring, died May 2, at the age of sixty-one. He was a graduate of the Medical College of Virginia in 1904, and since that time had practiced in Washington County. Dr. Preston was for a number of years surgeon for the Norfolk and Western Railway. He was a member of his local medical society and a former member of the Medical Society of Virginia. His wife, a son and three daughters survive him.

Dr. Charles Henry Moncure,

Prominent physician of Orange, died May 11, after a long period of ill health. He was eighty-one years of age and a graduate of the Medical College of Virginia in 1880. Dr. Moncure was formerly a member of the Medical Society of Virginia. His wife and two daughters survive him.

Dr. Thomas Allen Groover,

Of Washington, D. C., but well-known to many Virginians, died April 20, at the age of sixty-two years. Dr. Groover was formerly professor of roentgenology at the George Washington University School of Medicine, and was a member and past president of both the Medical Society of the District of Columbia and of the American Roentgen Ray Society.

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